ORDER NO. KM41006121CE

Service Manual

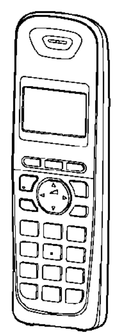
Telephone Equipment

Caller ID Compatible

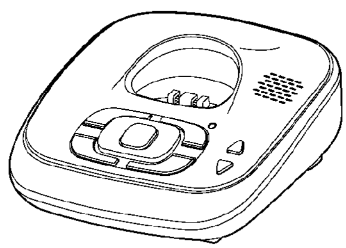
Model No. KX-TG4021LAT
KX-TG4022LAT
KX-TG4023LAT
KX-TGA403LAT

Expandable Digital Cordless Answering System

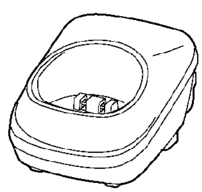
T: Black Metallic Version
(for Latin America)



KX-TGA403LAT
(Handset)



KX-TG4021LAT
(Base Unit)



(Charger Unit)

Configuration for each model

Model No	Base Unit	Handset	Charger Unit	Expandable
KX-TG4021	1 (TG4021)	1 (TGA403)		Up to 6
KX-TG4022	1 (TG4021)	2 (TGA403)	1	Up to 6
KX-TG4023	1 (TG4021)	3 (TGA403)	2	Up to 6

Information for optional accessories

You can expand your phone system by registering optional handsets (KX-TGA654LA/KX-TGA750LA) to a single base unit.
Optional handsets and the supplied handset are different model so that some functions may not be available.
Refer to each Operating Instruction for details.

Panasonic®

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product, the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear, please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

- When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.
- The illustrations in this Service Manual may vary slightly from the actual product.

TABLE OF CONTENTS

1 Safety Precautions

1.1. For Service Technicians

- **Repair service shall be provided in accordance with repair technology information such as service manual so as to prevent fires, injury or electric shock, which can be caused by improper repair work**.
  1. When repair services are provided, neither the products nor their parts or members shall be remodeled.
  2. If a lead wire assembly is supplied as a repair part, the lead wire assembly shall be replaced.
  3. FASTON terminals shall be plugged straight in and unplugged straight out.

- **ICs and LSIs are vulnerable to static electricity.**
  When repairing, the following precautions will help prevent recurring malfunctions.
  1. Cover plastic parts boxes with aluminum foil.
  2. Ground the soldering irons.
  3. Use a conductive mat on worktable.
  4. Do not grasp IC or LSI pins with bare fingers.

2 Warning

2.1. Battery Caution

1. Danger of explosion if battery is incorrectly replaced.
2. Replace only with the same or equivalent type recommended by the manufacturer.
3. Dispose of used batteries according to the manufacturer’s Instructions.

2.2. About Lead Free Solder (PbF: Pb free)

Note:

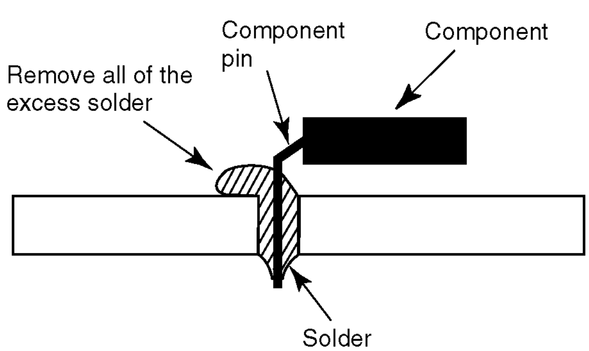
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver (Ag), and Copper (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder.

Caution

- PbF solder has a melting point that is 50 °F ~ 70 °F (30 °C ~ 40 °C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700 °F ± 20 °F (370 °C ± 10 °C).
- Exercise care while using higher temperature soldering irons.:
  Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100 °F (600 °C).
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).

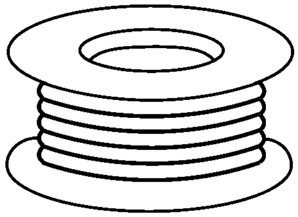
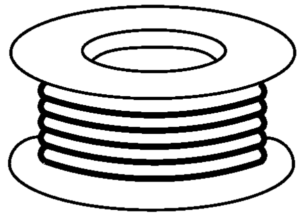
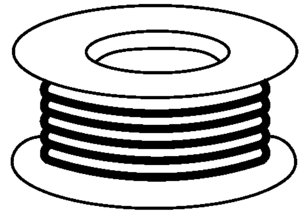


(Slice View)

2.2.1. Suggested PbF Solder

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+Cu), or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3 mm, 0.6 mm and 1.0 mm.

0.3 mm X 100 g	0.6 mm X 100 g	1.0 mm X 100 g
		

2.3. Discarding of P. C. Board

When discarding P. C. Board, delete all personal information such as telephone directory and caller list or scrap P. C. Board.

3 Specifications

■ **Number of channels:**
60 Duplex Channels

■ **Frequency range:**
1.91 GHz to 1.93 GHz

■ **Duplex procedure:**
TDMA (Time Division Multiple Access)

■ **Channel spacing:**
1,728 kHz

■ **Bit rate:**
1,152 kbit/s

■ **Modulation:**
GFSK (Gaussian Frequency Shift Keying)

■ **RF transmission power:**
115 mW (max.)

■ **Voice coding:**
ADPCM 32 kbit/s

	Base Unit	Handset	Charger
Power source	AC Adaptor (PQLV219Y, 120 V AC, 60 Hz)	Rechargeable Ni-MH battery AAA (R03) size (1.2 V 550 mAh)	AC Adaptor (PQLV219Y, 120 V AC, 60 Hz)
Receiving Method	Super Heterodyne	Super Heterodyne	——
Oscillation Method	PLL synthesizer	PLL synthesizer	——
Detecting Method	Quadrature Discriminator	Quadrature Discriminator	——
Tolerance of OSC Frequency	13.824 MHz ±100 Hz	10.368 MHz ±100 Hz	——
Modulation Method	Frequency Modulation	Frequency Modulation	——
ID Code	40 bit	40 bit	——
Ringer Equivalence No. (REN)	0.1	——	——
Dialing Mode	——	Tone (DTMF)/Pulse	——
Redial	——	Up to 48 digits	——
Speed Dialer	——	Up to 32 digits (Phonebook)	——
Power Consumption	Standby: Approx. 1.0 W Maximum: Approx. 4.0 W	11 days at Standby, 13 hours at Talk	Standby: Approx. 0.1 W, Maximum: Approx. 2.6 W
Operating Conditions	0 °C - 40 °C 20 % – 80 % relative air humidity (dry)	0 °C - 40 °C 20 % – 80 % relative air humidity (dry)	0 °C - 40 °C 20 % – 80 % relative air humidity (dry)
Dimensions (H x W x D)	Approx. 56 mm × 129 mm × 124 mm	Approx. 159 mm × 48 mm × 32 mm	Approx. 51 mm × 72 mm × 85 mm
Mass (Weight)	Approx. 170 g	Approx. 130 g	Approx. 60 g

Note:
- Design and specifications are subject to change without notice.

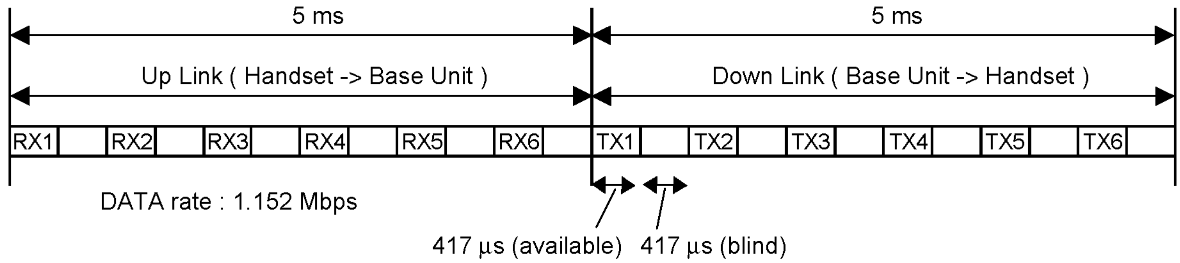
Note for Service:
- **Operation range:** Up to 300 m outdoors, Up to 50 m indoors, depending on the condition.
- **Analog telephone connection:** Telephone Line

4 Technical Descriptions

4.1. US-DECT Description

The frequency range of 1.91 GHz-1.93 GHz is used. Transmitting and receiving carrier between base unit and handset is same frequency. Refer to **Frequency Table** (P.56).

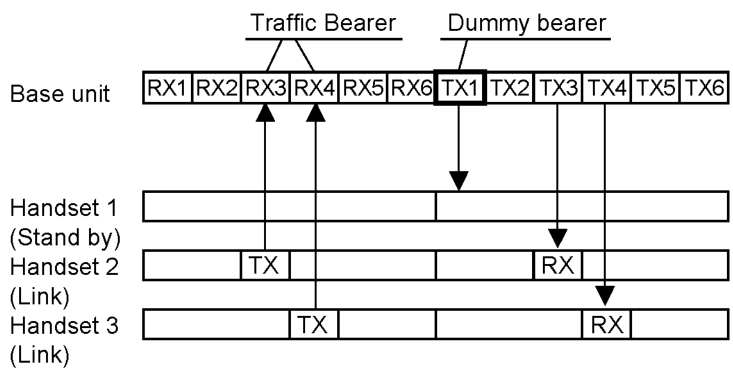
4.1.1. TDD Frame Format



4.1.2. TDMA system

This system is the cycles of 10 ms, and has 6 duplex paths, but maximum duplex communication path is 5 because of dummy bearer use.
In 1 slot 417 µs, the 10 ms of voice data is transmitted.

- **2 - Handsets Link**



Traffic Bearer

A link is established between base unit and handset.
The state where duplex communication is performed.
Handset doesn't make up duplex in no free RF channels because of interference. (*1)

Dummy Bearer

Base unit sends Dummy-data to the all stand-by state handsets.
Handsets receive that data for synchronization and monitoring request from the base unit.
Base unit doesn't send Dummy bearer in no free RF channels because of interference. (*1)

Note:

(*1) It is a feature under FCC 15 regulation and for interference avoidance.
In the case of checking RF parts, it is better in least interference condition.

4.1.3. Signal Flowchart in the Radio Parts

Reception

A voice signal from TEL line is encoded to digital data "TXDATA" by BBIC (IC501) in a base unit.
Then TXDATA goes to RF PART and it's modulated to 1.9 GHz. The RF signal is amplified and fed to a selected antenna.

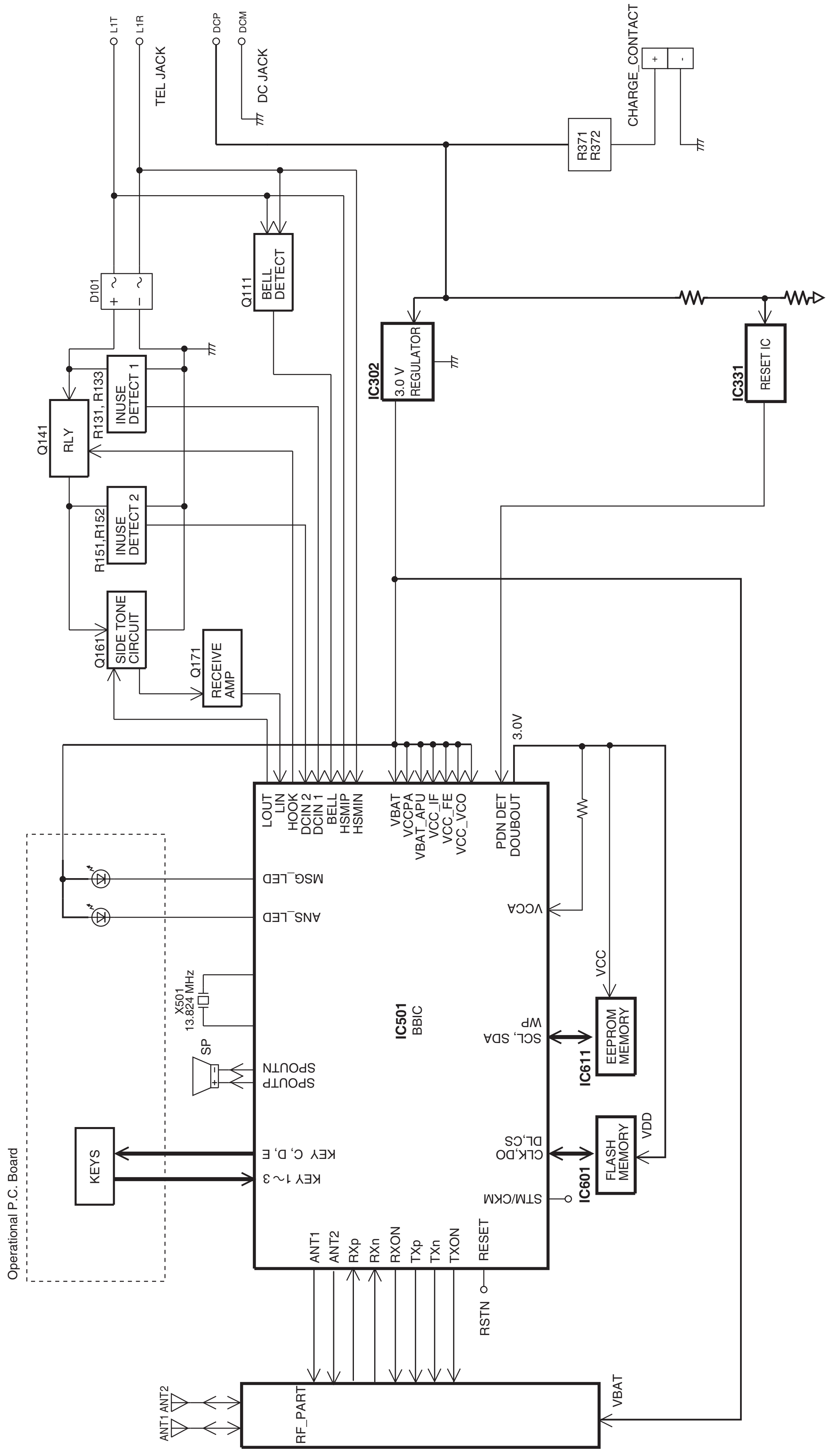
As for a handset RF, RF signal is received in one antenna.
BBIC down-converts to 864 kHz IF signal from RX signal and demodulates it to digital data "RXDATA".
BBIC (IC1) converts RXDATA into a voice signal and outputs it to speaker.

Transmission

A voice signal from microphone is encoded to digital data "TXDATA" by BBIC (IC1) in a handset.
Then TXDATA goes to RF PART, and it's modulated to 1.9 GHz. The RF signal is amplified and fed to a antenna.

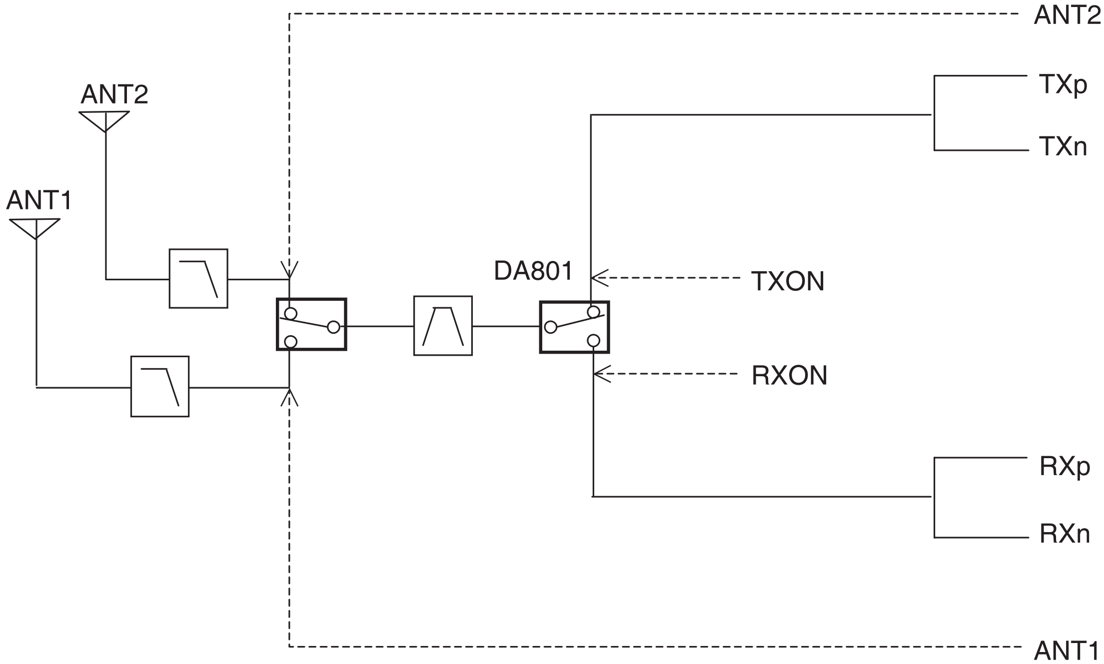
As for a base unit RF, RF signal is received in two antennas.
BBIC (IC501) compares RF signal levels and selects the antenna to be used. Then BBIC down-converts to 864 kHz IF signal from RX signal in the selected antenna, and demodulates it to digital data "RXDATA".
BBIC (IC501) converts RXDATA into a voice signal and outputs it to TEL line.

4.2. Block Diagram (Base Unit_Main)



KX-TG4021/4022/4023 BLOCK DIAGRAM (Base Unit_Main)

4.3. Block Diagram (Base Unit_RF Part)



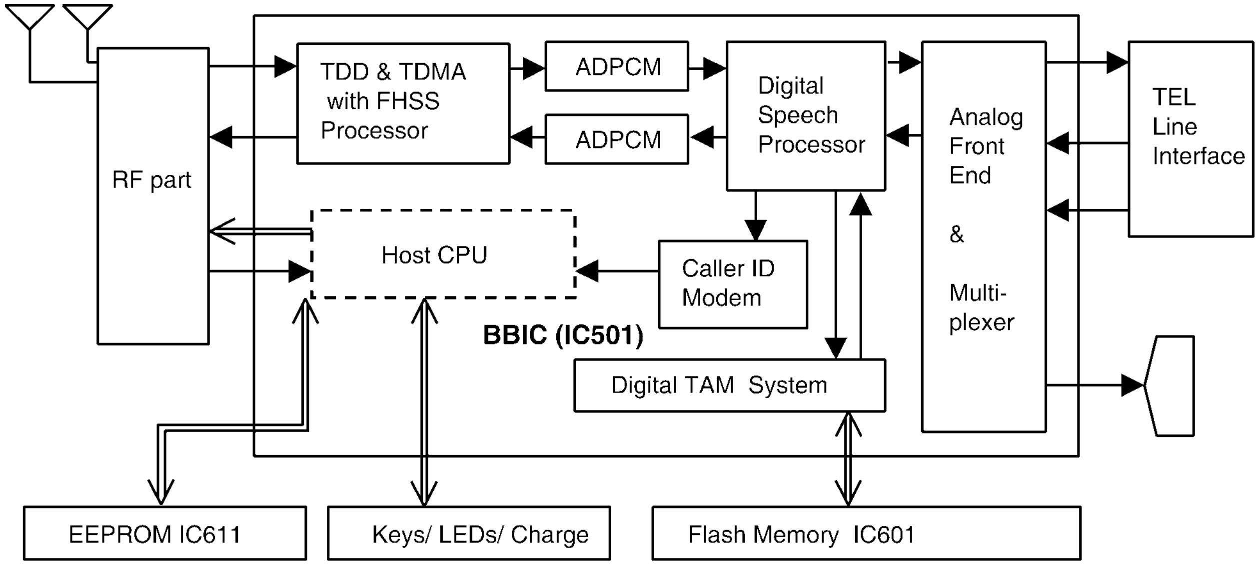
KX-TG4021/4022/4023 BLOCK DIAGRAM (Base Unit_RF Part)

4.4. Circuit Operation (Base Unit)

General Description:

(BBIC, Flash Memory, EERROM) is a digital speech/signal processing system that implements all the functions of speech compression, record and playback, and memory management required in a digital telephone answering machine.

The BBIC system is fully controlled by a host processor. The host processor provides activation and control of all that functions as follows.



4.4.1. BBIC (Base Band IC: IC501)

- **Voice Message Recording/Play back**
  The BBIC system uses a proprietary speech compression technique to record and store voice message in Flash Memory.
  An error correction algorithm is used to enable playback of these messages from the Flash Memory.
- **DTMF Generator**
  When the DTMF data from the handset is received, the DTMF signal is output.
- **Synthesized Voice (Pre-recorded message)**
  The BBIC implements synthesized Voice, utilizing the built in speech detector and a Flash Memory, which stored the vocabulary.
- **Caller ID demodulation**
  The BBIC implements monitor and demodulate the FSK/DTMF signals that provide CID information from the Central Office.
- **Digital Switching**
  The voice signal from telephone line is transmitted to the handset or the voice signal from the handset is transmitted to the Telephone line, etc. They are determined by the signal path route operation of voice signal.
- **Block Interface Circuit**
  RF part, LED, Key scan, Speaker, Telephone line.

4.4.2. Flash Memory (IC601)

Following information data is stored.

- **Voice signal**
  ex: Pre-recorded Greeting message, Incoming message

4.4.3. EEPROM (IC611)

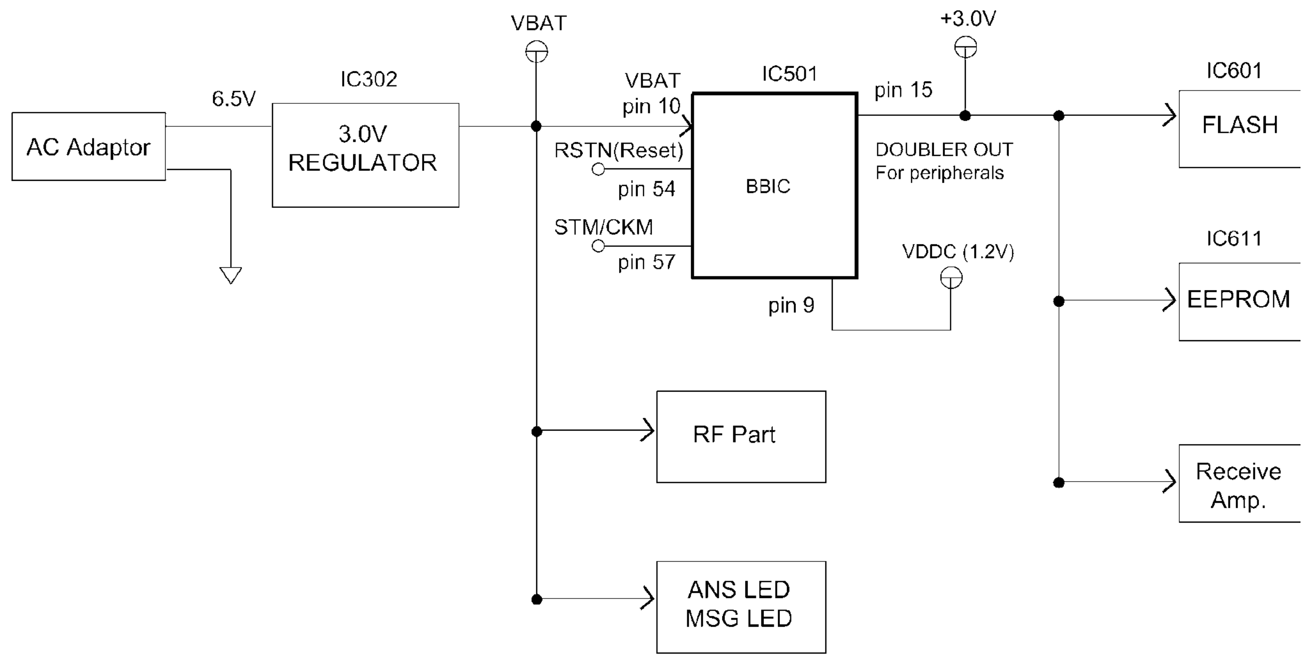
Following information data is stored.

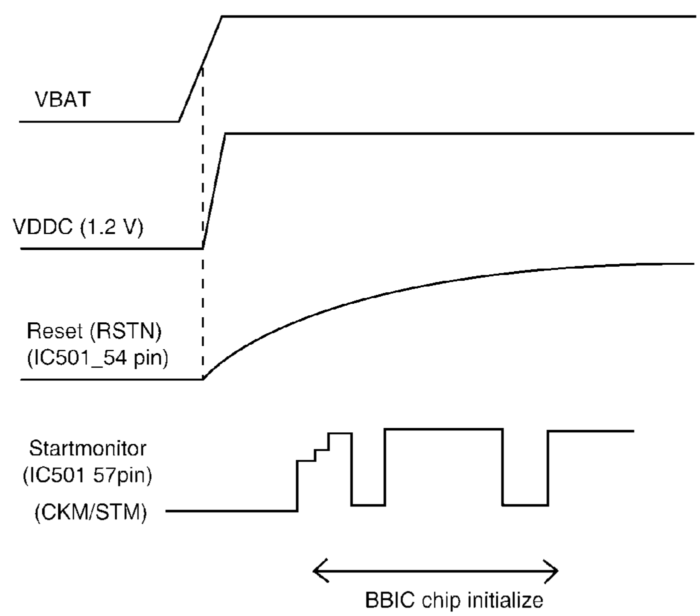
- **Settings**
  ex: message numbers, ID code, Flash Time, Tone/Pulse

4.4.4. Power Supply Circuit/Reset Circuit

The power supply voltage from AC adaptor is converted to VBAT (3.0V) in IC302. And +3.0V for peripherals and analog part is insulated from VBAT by Doubler of BBIC.

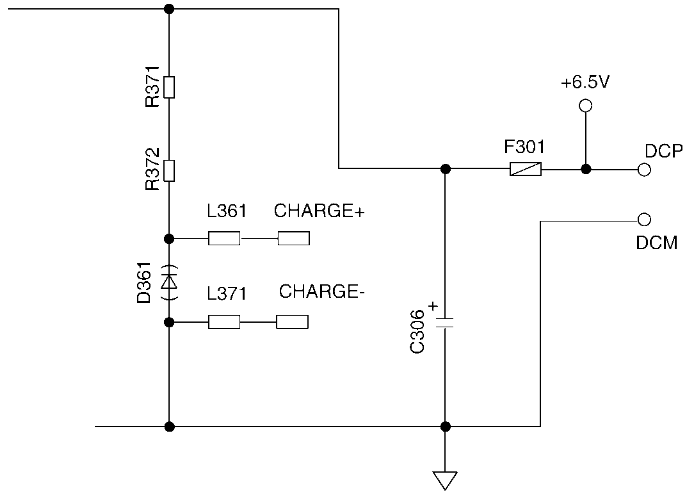
Circuit Operation:





4.4.4.1. Charge Circuit

The voltage from the AC adaptor is supplied to the charge circuits.



4.4.5. Telephone Line Interface

Telephone Line Interface Circuit:

Function

- Bell signal detection
- ON/OFF hook and pulse dial circuit
- Side tone circuit

Bell signal detection and OFF HOOK circuit:

In the idle mode, Q141 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:

T → L101 → R111 → C111 → Q111 → BBIC pin 5 [BELL]

When the CPU (BBIC) detects a ring signal, Q141 turns on, thus providing an off-hook condition (active DC current flow through the circuit). Following signal flow is the DC current flow.

T → L101 → D101 → Q141 → Q161 → R163 → R167 → D101 → L102 → P101 → R

ON HOOK Circuit:

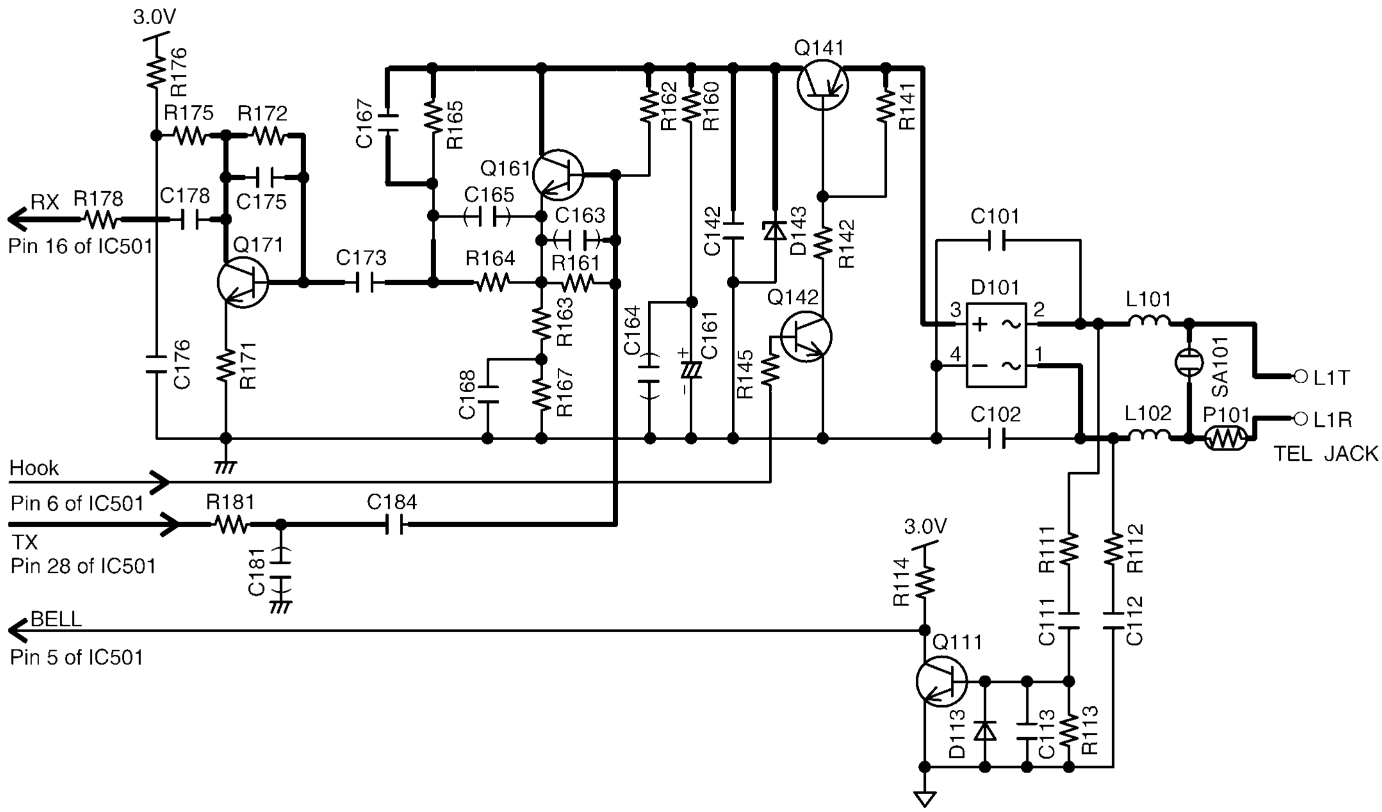
Q141 is open, Q141 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

Pulse Dial Circuit:

Pin 6 of BBIC turns Q141 ON/OFF to make the pulse dialing.

Side Tone Circuit:

Basically this circuit prevents the TX signal from feeding back to RX signal. As for this unit, TX signal feed back from Q161 is canceled by the canceller circuit of BBIC.



4.4.6. Parallel Connection Detect Circuit/Auto Disconnect Circuit

Function:

In order to disable call waiting and stutter tone functions when using telephones connected in parallel, it is necessary to have a circuit that judges whether a telephone connected in parallel is in use or not. This circuit determines whether the telephone connected in parallel is on hook or off hook by detecting changes in the T/R voltage.

Circuit Operation:

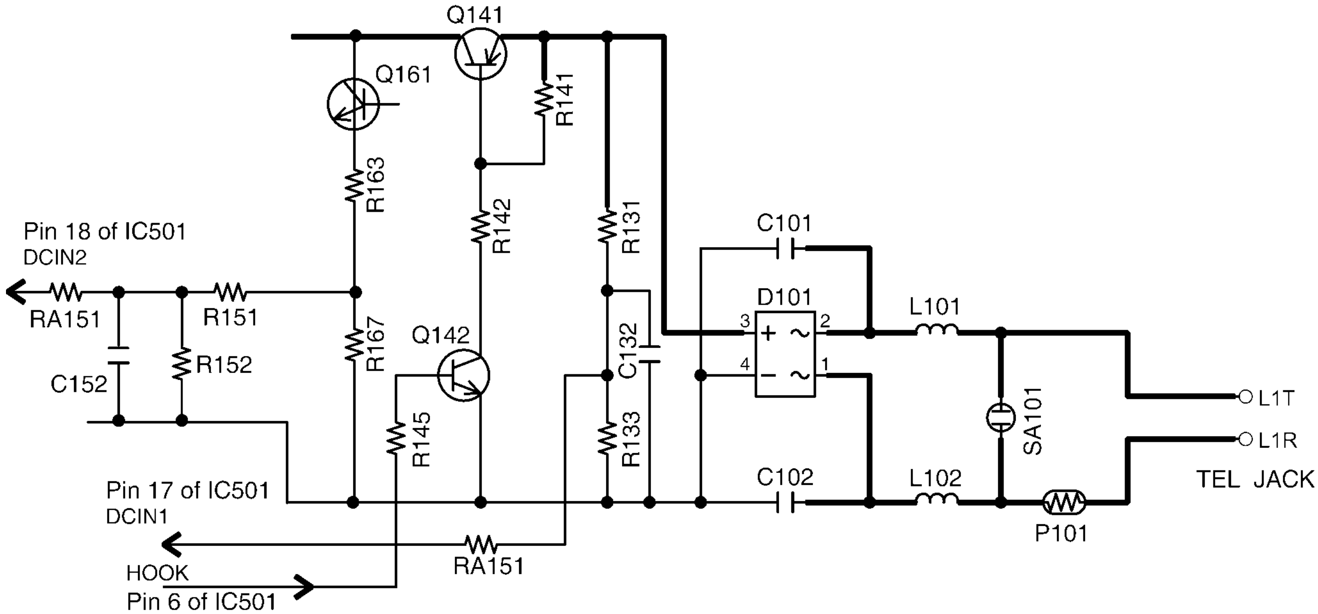
Parallel connection detection when on hook:

When on hook, the voltage is monitored at pin 17 of IC501. There is no parallel connection if the voltage is 0.54 V or higher, while a parallel connection is deemed to exist if the voltage is lower.

Parallel connection detection when off hook:

When off hook, the voltage is monitored at pin 18 of IC501; the presence/absence of a parallel connection is determined by detecting the voltage changes.

If the Auto disconnect function is ON and statuses are Hold, receiving ICM, OGM transmitting, BBIC disconnects the line after detecting parallel connection is off hook.



4.4.7. Calling Line Identification (Caller ID)/Call Waiting Caller ID

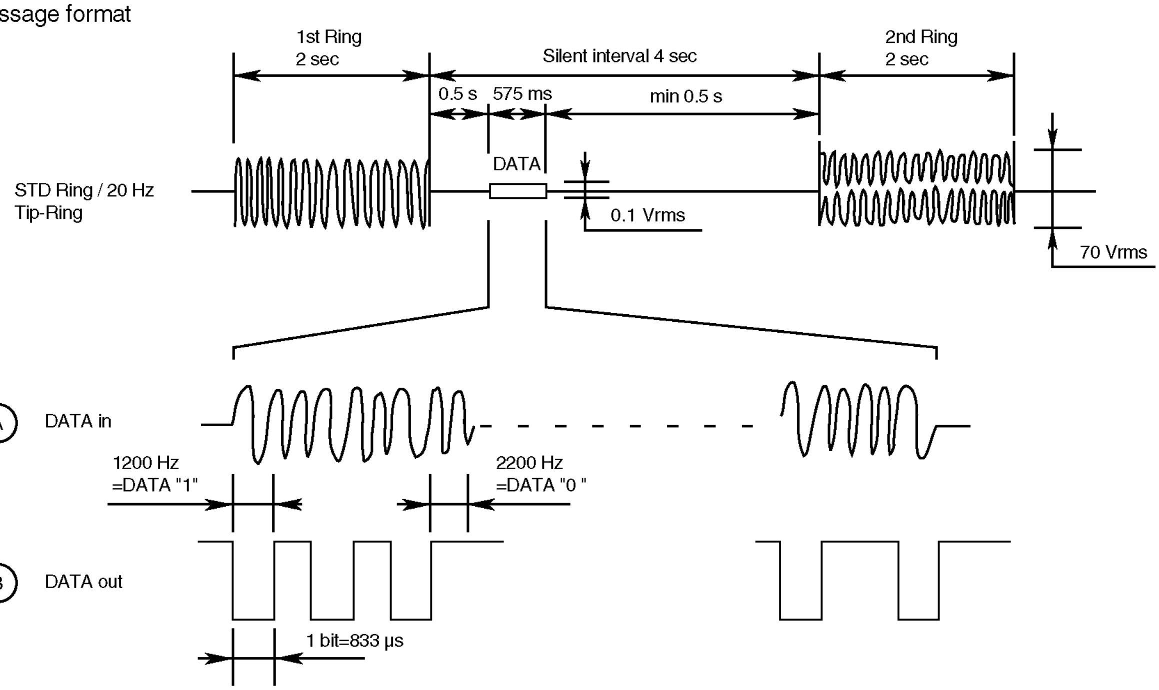
Function:

Caller ID

The caller ID is a chargeable ID which the user of a telephone circuit obtains by entering a contract with the telephone company to utilize a caller ID service. For this reason, the operation of this circuit assumes that a caller ID service contract has been entered for the circuit being used. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) * format. Data "1" is a 1200 Hz sine wave, and data "0" is a 2200 Hz sine wave. There are two types of the message format which can be received: i.e. the single message format and plural message format. The plural message format allows to transmit the name and data code information in addition to the time and telephone number data.

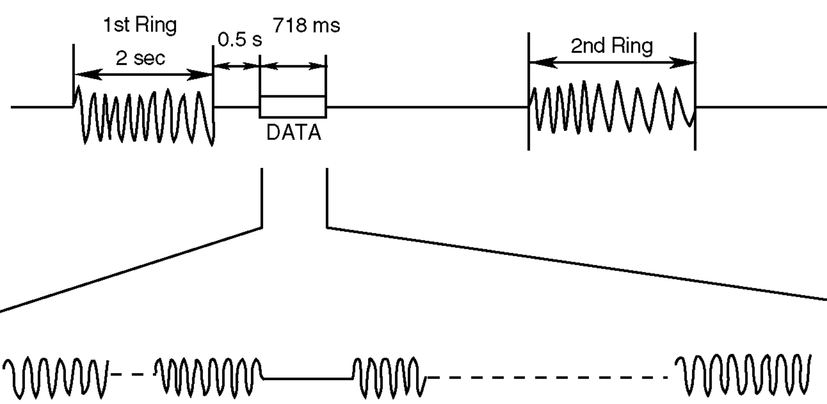
*: Also the telephone exchange service provides other formats.

- Single message format



month		day		hour		minute		number
04	–	15	–	16	–	35	–	2013487000

- Plural message format



DATA CODE	NAME
201	John Smith

month		day		hour		minute		number
04	–	16	–	16	–	35	–	2013487000

Call Waiting Caller ID

Calling Identity Delivery on Call Waiting (CIDCW) is a CLASS service that allows a customer, while off-hook on an existing call, to receive information about a calling party on a waited call. The transmission of the calling information takes place almost immediately after the customer is alerted to the new call so he/she can use this information to decide whether to take the new call.

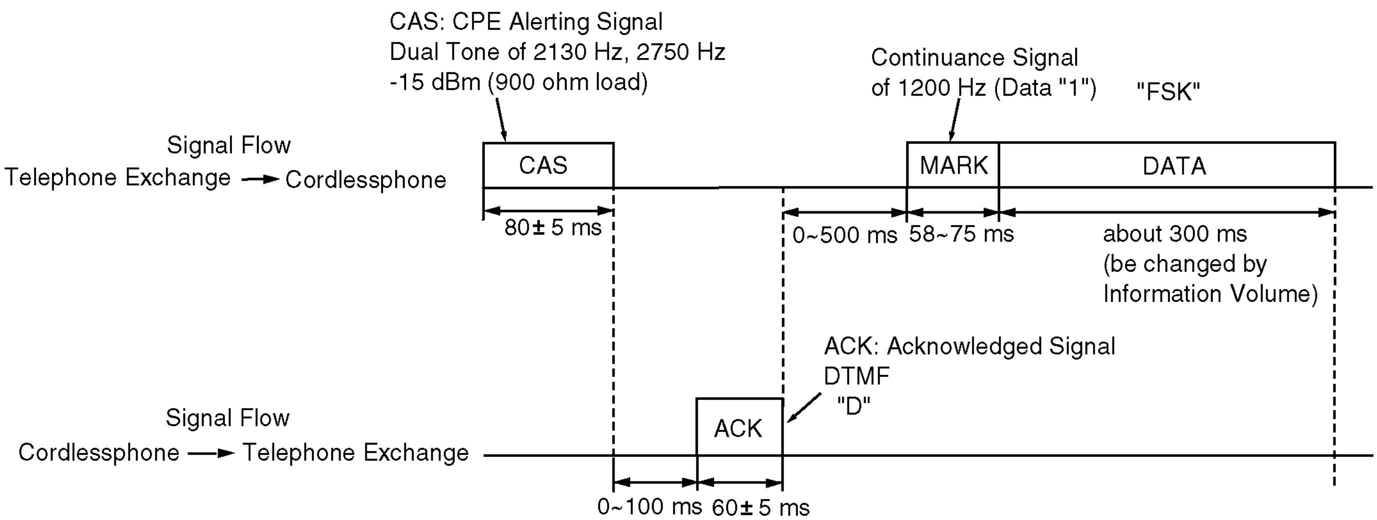
Function:

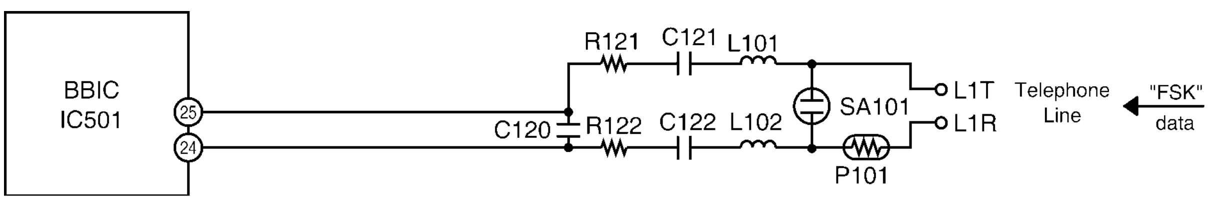
The telephone exchange transmits or receives CAS and ACK signals through each voice RX/TX route. Then FSK data and MARK data pass the following route.

Telephone Line → P101 → L101, L102 → C121, C122 → R121, R122 → IC501 (25, 24).

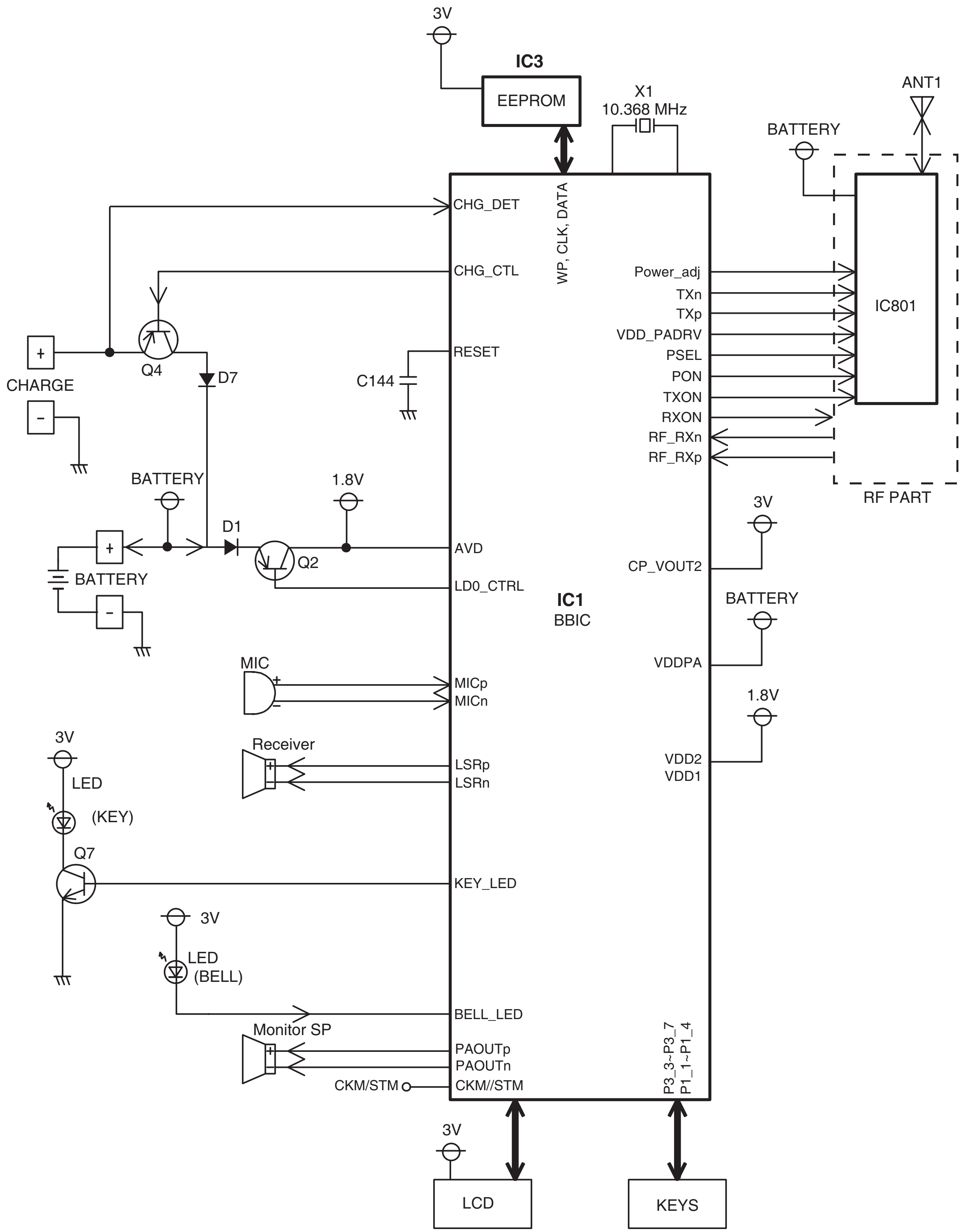
If the unit deems that a telephone connected in parallel is in use, ACK is not returned even if CAS is received, and the information for the second and subsequent callers is not displayed on the portable handset display.

Call Waiting Format



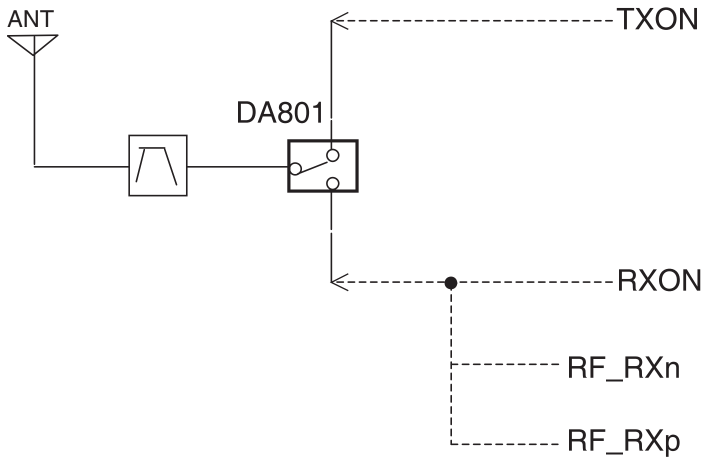


4.5. Block Diagram (Handset)



KX-TGA403 BLOCK DIAGRAM (Handset)

4.6. Block Diagram (Handset_RF Part)



KX-TGA403 BLOCK DIAGRAM (Handset_RF Part)

4.7. Circuit Operation (Handset)

4.7.1. Outline

Handset consists of the following ICs as shown in **Block Diagram (Handset)** (P.18).

- DECT BBIC (**B**ase **B**and IC): IC1
  - All data signals (forming/analyzing ACK or CMD signal)
  - All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD, RF Power Amp.)
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - Reception
- RF Power Amp: IC801
  - Amplifier for transmission
- EEPROM: IC3
  - Temporary operating parameters (for RF, etc.)

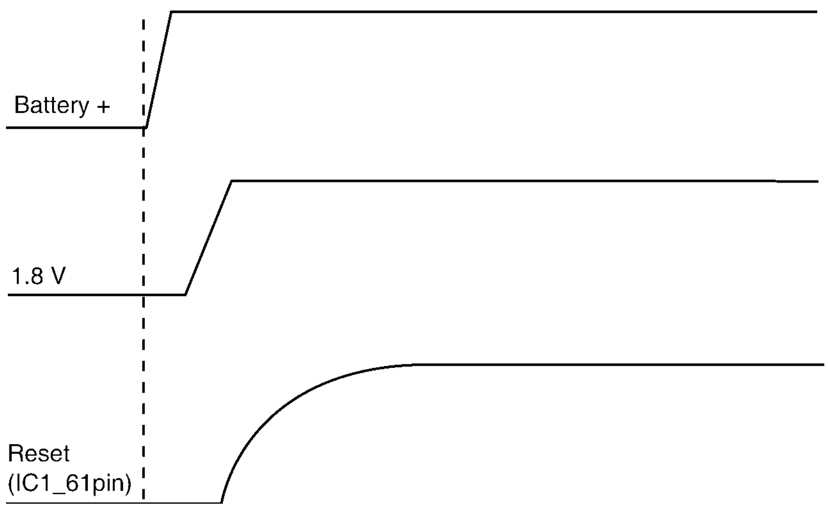
4.7.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

When power on the Handset, the voltage is as follows;

BATTERY(2.2 V ~ 2.6 V: BATT+) → F1 → Q2 (1.8 V), IC1-43pin (2.5V)

The Reset signal generates IC1 (61 pin) and 1.8 V.



4.7.3. Charge Circuit

Circuit Operation:

When charging the handset on the Base Unit, the charge current is as follows;

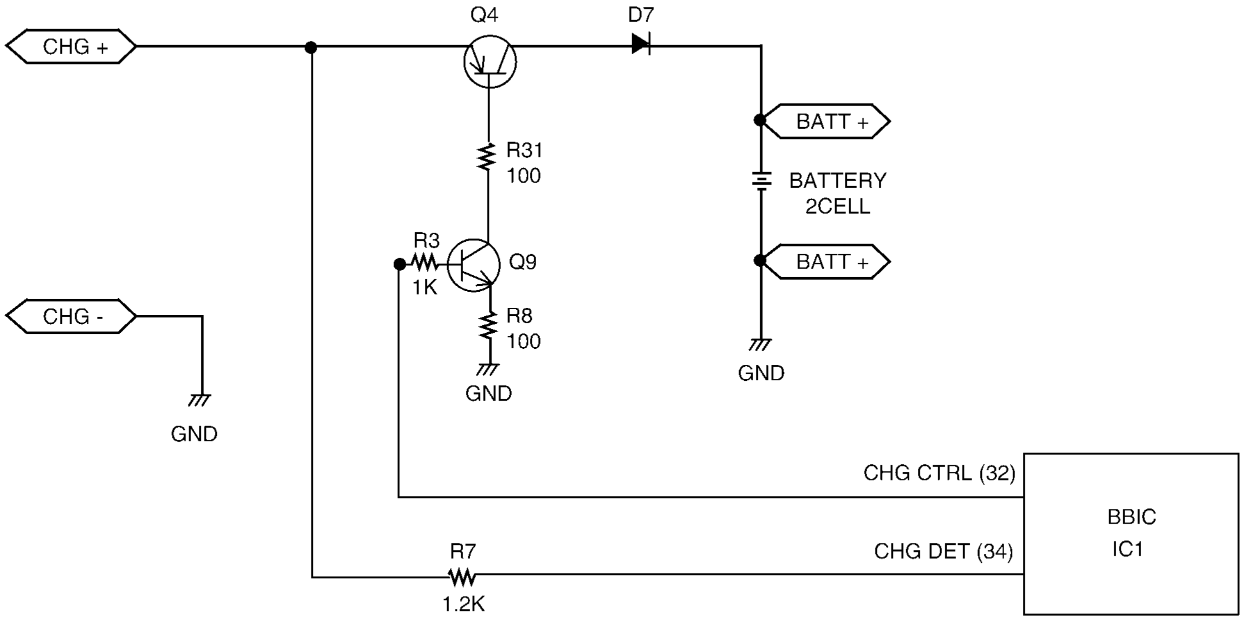
DC+(6.5 V) → F301 → R371 → R372 →CHARGE+(Base) → CHARGE+(Handset) → Q4 → D7→ F1 → BATTERY+... Battery...

BATTERY- → R45 → GND → CHARGE-(Handset)→ CHARGE-(Base) → GND → DC-(GND)

In this way, the BBIC on Handset detects the fact that the battery is charged.

The charge current is controlled by switching Q9 of Handset.

Refer to Fig.101 in **Power Supply Circuit/Reset Circuit** (P.12).



4.7.4. Battery Low/Power Down Detector

Circuit Operation:

"Battery Low" and "Power Down" are detected by BBIC which check the voltage from battery.

The detected voltage is as follows;

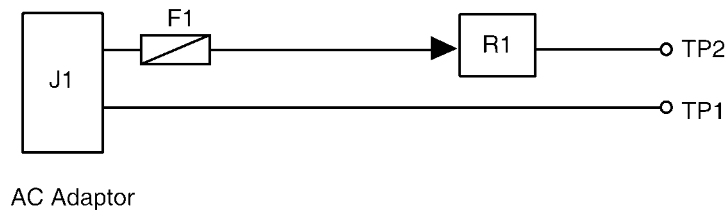
- Battery Low
  Battery voltage: V(Batt) ≦ 2.25 V ± 50 mV
  The BBIC detects this level and "" starts flashing.
- Power Down
  Battery voltage: V(Batt) ≦ 2.0 V ± 50 mV
  The BBIC detects this level and power down.

4.7.5. Speakerphone

The hands-free loudspeaker at SP+ and SP- is used to generate the ring alarm.

4.8. Circuit Operation (Charger Unit)

Charge control is executed at handset side so that the operation when using charger is also controlled by handset.
Refer to **Circuit Operation (Handset)** (P.20)



The route for this is as follows: DC+pin of J1(+) → F1 → R1 → CHARGE+pad → Handset → CHARGE-pad → DC-pin of J1(-).

4.9. Signal Route

SIGNAL ROUTE	IN → ROUTE → OUT
HANDSET TX	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(19/20) - **<HANDSET_RF_TX_ROUTE>** - ANT. ---
	---ANT. - **<BASE_UNIT_RF_RX_ROUTE>** - IC501(46/47 - 28) - R181 - C184 - Q161 - Q141 - D101 - L101/[L102 - P101] - T/R(TEL LINE)
HANDSET RX	T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178 - IC501(16 - 44/45) - **<BASE_UNIT_RF_TX_ROUTE>** - ANT. ---
	--- ANT. - **<HANDSET_RF_RX_ROUTE>** - IC1(15/16)- HANDSET SPEAKER
HANDSET SP-Phone TX	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(19/20) - **<HANDSET_RF_TX_ROUTE>** - ANT. ---
	---ANT. - **<BASE_UNIT_RF_RX_ROUTE>** - IC501(46/47 - 28) - R181 - C184 - Q161 - Q141 - D101 - L101/[L102 - P101] -T/R(TEL LINE)
HANDSET SP-Phone RX	T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 -R178 - IC501(16-44/45) - **<BASE_UNIT_RF_TX_ROUTE>** - ANT. ---
	--- ANT. -**<HANDSET_RF_RX_ROUTE>** - IC1(33/35) - Backside SP
GREETING RECORDING	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(19/20) - **<HANDSET_RF_TX_ROUTE>** - ANT. ---
	---ANT. - **<BASE_UNIT_RF_RX_ROUTE>** - IC501(46/47- 73/74) - IC601
GREETING PLAY TO TEL LINE	IC601 - IC501(73/74 - 28) - R181 - C184 - Q161 - Q141 - D101 - L101/[L102 - P101] - T/R(TEL LINE)
ICM RECORDING	T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178 - IC501(16 - 73/74) - IC601
ICM PLAY TO SPEAKER	IC601 - IC501(73/74 - 29/31) - L474/L476 - SPEAKER
DTMF SIGNAL TO TEL LINE	IC501(28) - R181 - C184 - Q161 - Q141 - D101 - L101/[L102 - P101] - T/R(TEL LINE)
CALLER ID	T/R(TEL LINE) - L101/[P101 - L102] - C121/C122 - R121/R122 - IC501(24/25)
BELL DETECTION	T/R(TEL LINE) - L101/[P101 - L102] - R111/R112 - C111/C112 - Q111 - IC501(5)

Note:

[box]: inside of Handset

RF part signal route

SIGNAL ROUTE	IN → ROUTE → OUT
HANDSET RF [TX_ROUTE]	IC1(77/78) - IC801(3/4) - IC801(8/9) - L802/C813 - C812 - DA801 - C803 - ANT
HANDSET RF [RX_ROUTE]	ANT - C803 - DA801 - C826 - IC1(2/3)
BASE UNIT RF [TX_ROUTE]	IC501(44/45) - C812 - L809 - DA801 - C895 - DA802 - C893/C894 - ANT1/ANT2
BASE UNIT RF [RX_ROUTE]	ANT1/ANT2 - C893/C894 - DA802 - C895 - DA801 - C826 - IC501(46/47)

Note:

[ ]: inside of Handset

5 Location of Controls and Components

Refer to the Operating Instructions.

Note:

You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

6 Installation Instructions

Refer to the Operating Instructions.

Note:

You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

7 Operating Instructions

Refer to the Operating Instructions.

Note:

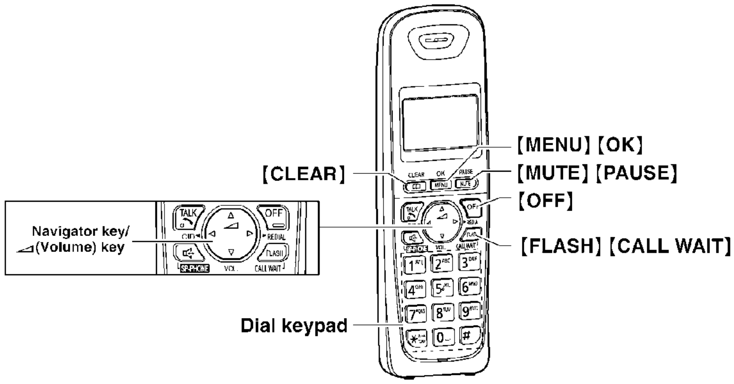
You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

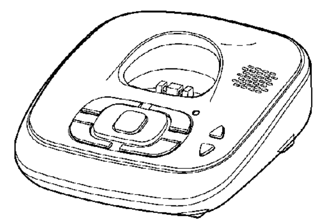
8 Test Mode

8.1. Engineering Mode

8.1.1. Base Unit

Important:
Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.





H/S key operation | **H/S LCD**

1). Press MENU .

2). Select "Initial setting" using [▲]or[▼] then press OK or [►].

Select "Set tel line" using [▲]or[▼] then press OK or [►].

3). Enter "7", "2", "6", "2", "7", "6", "6", "4".
Note: 7262 7664 = PANA SONI
(see letters printed on dial keys)

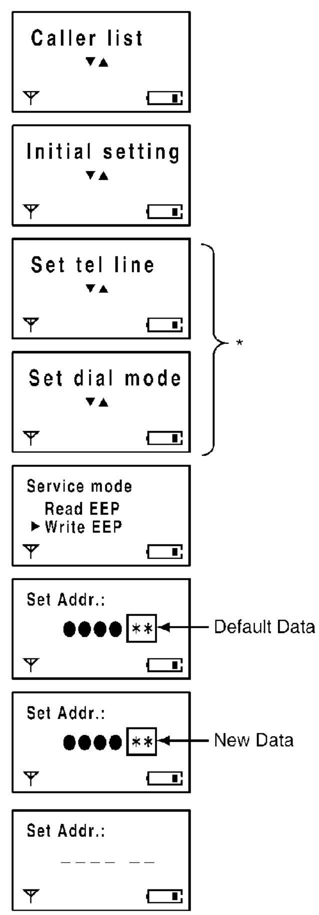
4). Select "Write EEP" using [▲]or[▼] then press OK or [►].

5). Enter "●", "●", "●", "●" (Address). (*1)

6). Enter "*", "*" (New Data). (*1)

7). Press OK , a long confirmation beep will be heard.

8). Press [OFF] to return to standby mode.
After that, turn the base unit power off and then power on.



Note: * To enter "Set dial mode ", press OK or [►] at " Set tel line".
It is necessary to turn on the power of base unit.

Frequently Used Items (Base Unit)

ex.)

Items	Address	Default Data	New Data		Remarks
Frequency	00 07 / 00 08	00/01	-	-	Use these items in a **READ-ONLY** mode to confirm the contents. Careless rewriting may cause serious damage to the computer system.
ID	00 02 ~ 00 06	Given value	-	-	

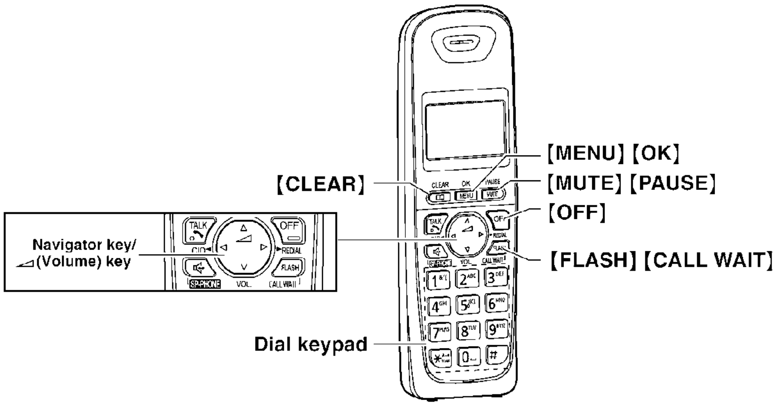
Note:

(*1) When you enter the address or New Data, please refer to the table below.

Desired Number (hex)	Input Keys	Desired Number (hex)	Input Keys
0	0	A	[Flash] + 0
1	1	B	[Flash] + 1
.	.	C	[Flash] + 2
.	.	D	[Flash] + 3
.	.	E	[Flash] + 4
9	9	F	[Flash] + 5

8.1.2. Handset

Important:
Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.



H/S key operation	H/S LCD
1). Press MENU .	Caller list ▼▲
2). Select "Initial setting" using [▲] or [▼] then press OK or [►].	Initial setting ▼▲
3). Enter "7", "2", "6", "2", "7", "6", "6", "4". **Note:** 7262 7664 = PANA SONI (see letters printed on dial keys)	Set tel line ▼▲
	Set dial mode ▼▲
4). Select "Write EEP" using [▲] or [▼] then press OK or [►].	Service mode / Read EEP / ►Write EEP
5). Enter "●", "●", "●", "●" (Address). (*1)	Set Addr.: ●●●● [**] ← Default Data
6). Enter "*", "*" (New Data). (*1)	Set Addr.: ●●●● [**] ← New Data
7). Press OK , a long confirmation beep will be heard.	Set Addr.: ---- --

8). Press [OFF] to return to standby mode.
After that, remove and reinsert the batteries. Press the Power button for about 1 second if the power is not turned on.

Frequently Used Items (Handset)

ex.)

Items	Address	Default Data	New Data	Possible Adjusted Value MAX (hex)	Possible Adjusted Value MIN (hex)	Remarks
Battery Low	00 11 / 00 12	00 / 00	-	-	-	(*2)
Frequency	00 07 / 00 08	00 / 01	-	-	-	
ID	00 02 ~ 00 06	Given value	-	-	-	

Note:

(*1) When you enter the address or New Data, please refer to the table below.

Desired Number (hex.)	Input Keys	Desired Number (hex.)	Input Keys
0	0	A	[Flash] + 0
1	1	B	[Flash] + 1
.	.	C	[Flash] + 2
.	.	D	[Flash] + 3
.	.	E	[Flash] + 4
9	9	F	[Flash] + 5

(*2) Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the handset.

9 Service Mode

9.1. How to Clear User Setting (Handset Only)

Handset

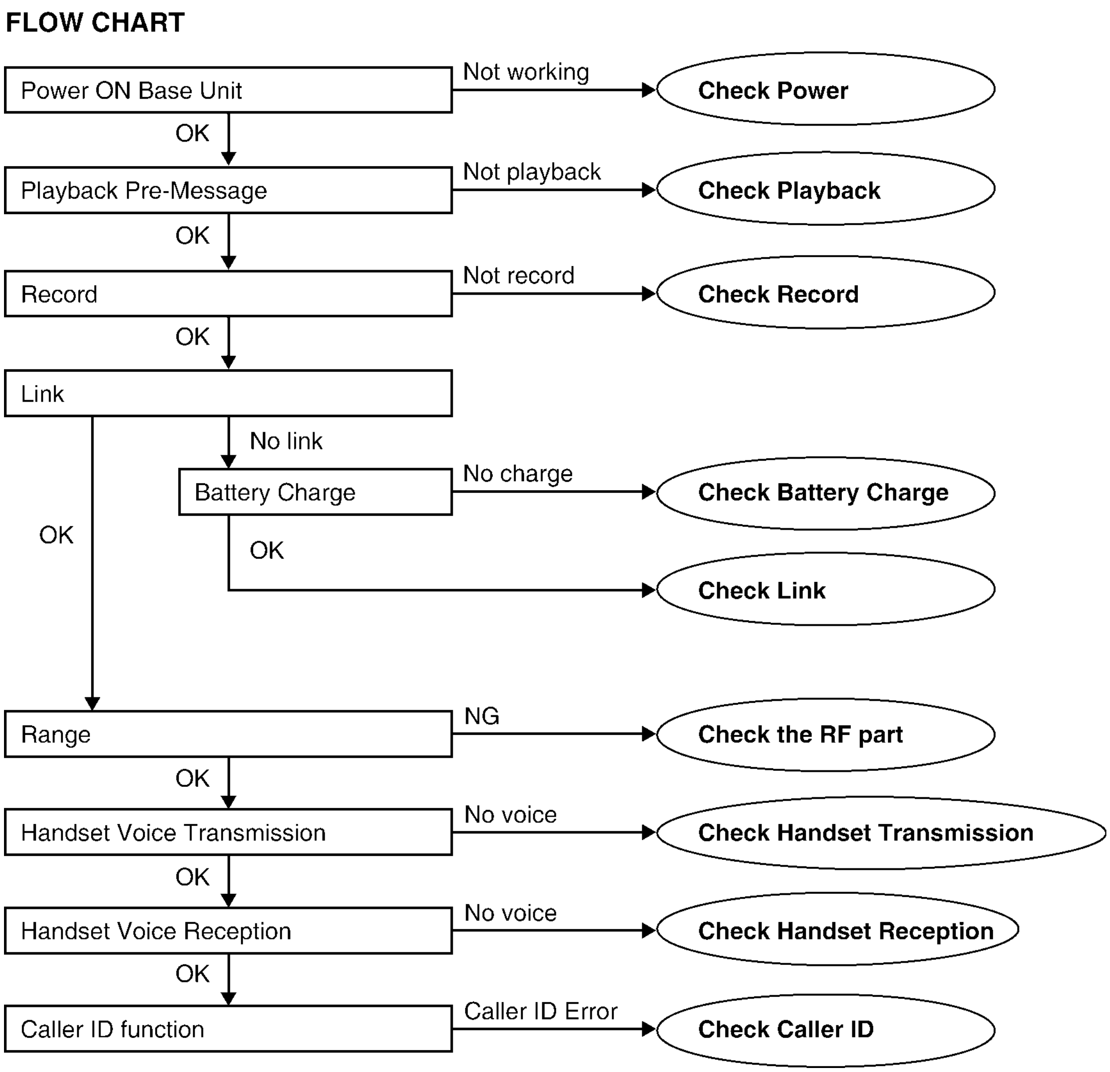
Press [2],[5],[8],[0] simultaneously until a beep sound is heard. Then single handset is initialized.

(The contents of user setting are reset to factory default)

*Usage time is not cleared.

10 Troubleshooting Guide

10.1. Troubleshooting Flowchart

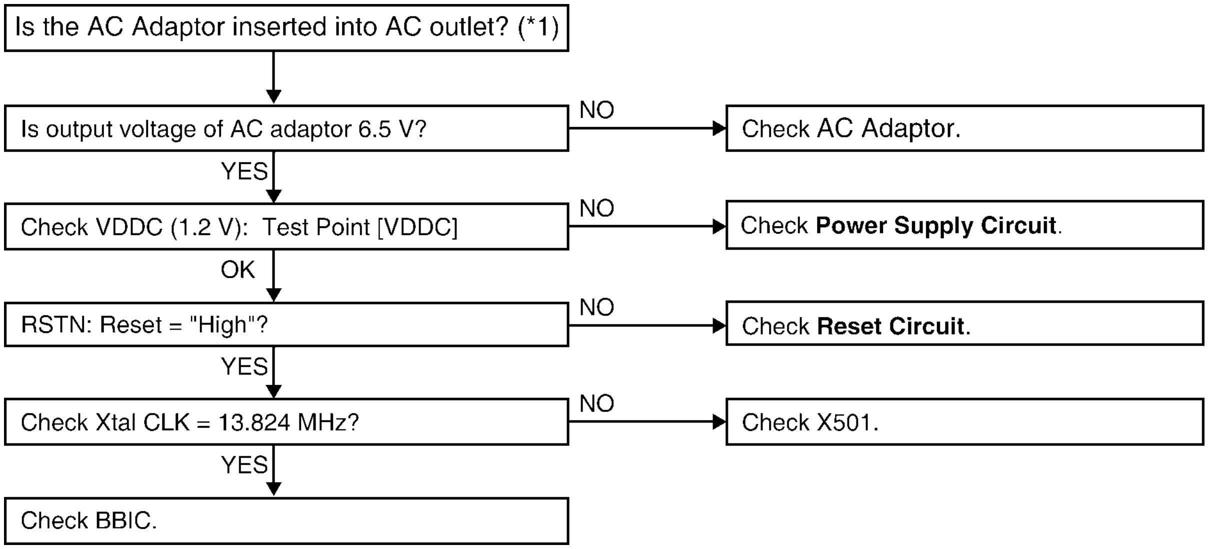


Cross Reference:

Check Power (P.32)
Check Playback (P.34)
Check Record (P.33)
Check Battery Charge (P.34)
Check Link (P.35)
Check the RF part (P.37)
Check Handset Transmission (P.42)
Check Handset Reception (P.42)
Check Caller ID (P.42)

10.1.1. Check Power

10.1.1.1. Base Unit



Cross Reference:

Power Supply Circuit/Reset Circuit (P.12)

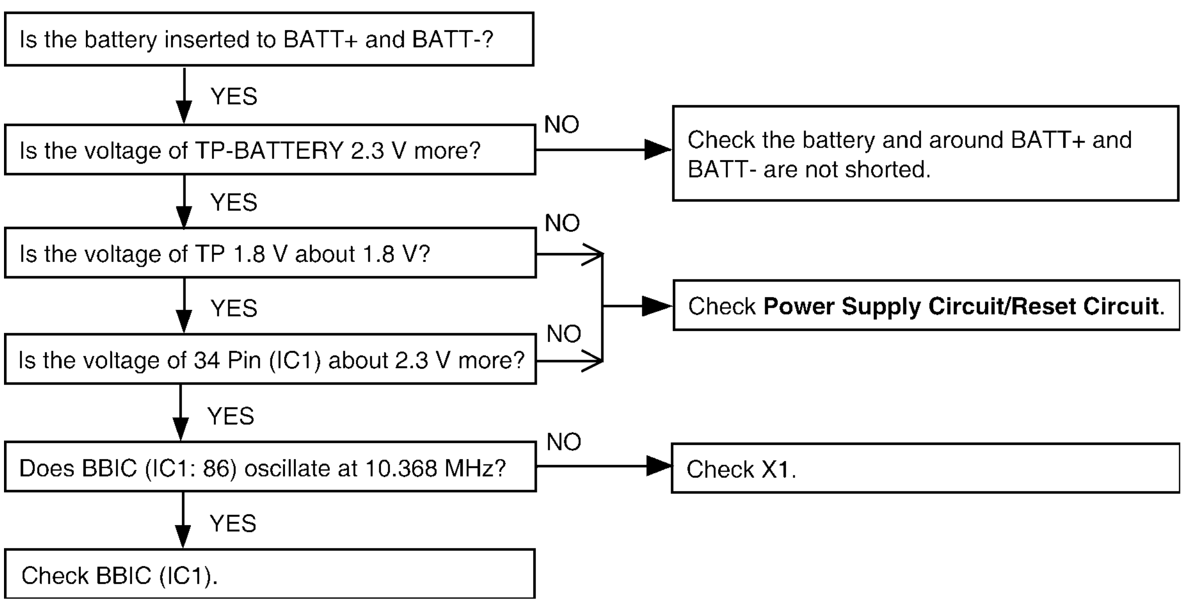
Note:

BBIC is IC501.

(*1) Refer to **Specifications** (P.6) for part number and supply voltage of AC adaptor.

(*2) Refer to **Circuit Board (Base Unit_Main)** (P.73).

10.1.1.2. Handset



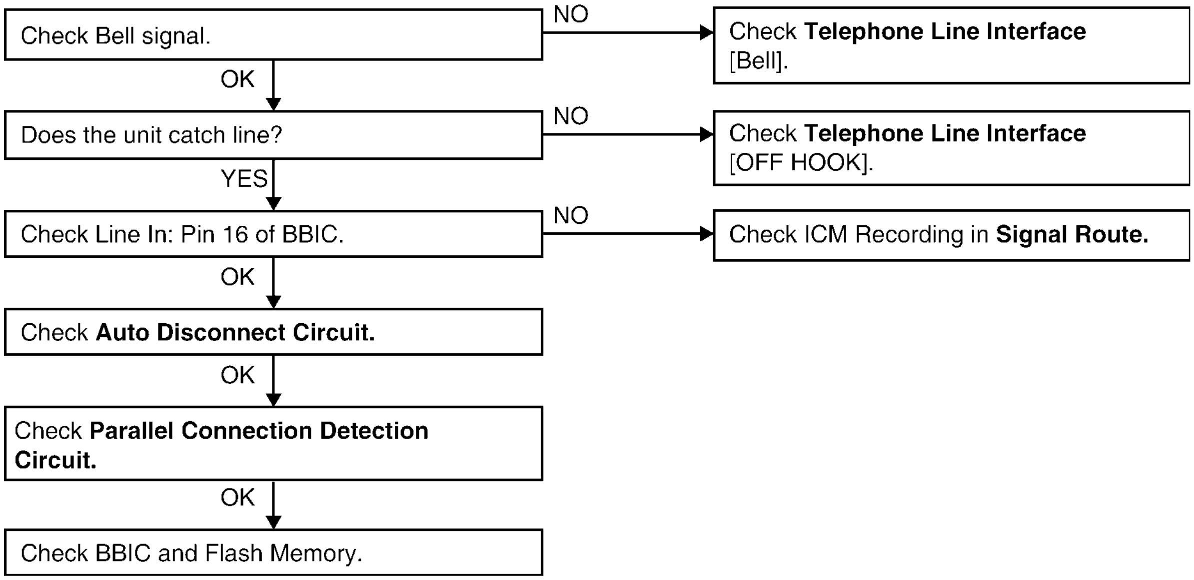
Cross Reference:

Power Supply Circuit/Reset Circuit (P.20)

10.1.2. Check Record

10.1.2.1. Base Unit

A) Not record Incoming Message



Cross Reference:

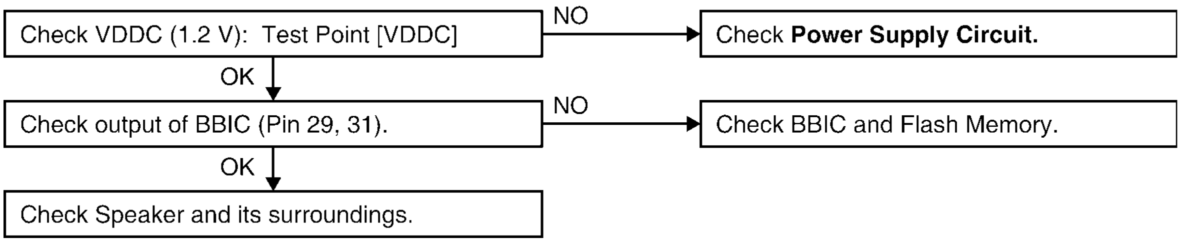
Signal Route (P.23)
Telephone Line Interface (P.14)
Parallel Connection Detect Circuit/Auto Disconnect Circuit (P.15)

Note:

Flash Memory is IC601.
BBIC is IC501.

10.1.3. Check Playback

10.1.3.1. Base Unit



Cross Reference:

Power Supply Circuit/Reset Circuit (P.12)

Note:

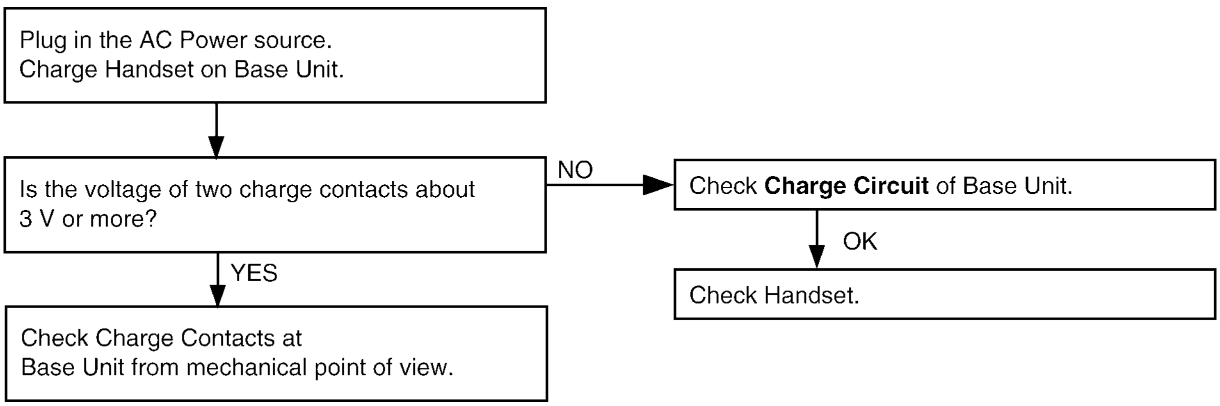
Flash Memory is IC601.

BBIC is IC1.

(*1) Refer to **Circuit Board (Base Unit_Main)** (P.73).

10.1.4. Check Battery Charge

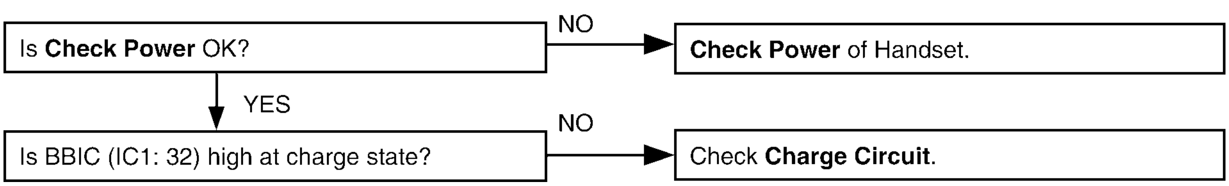
10.1.4.1. Base Unit



Cross Reference:

Charge Circuit (P.13)

10.1.4.2. Handset

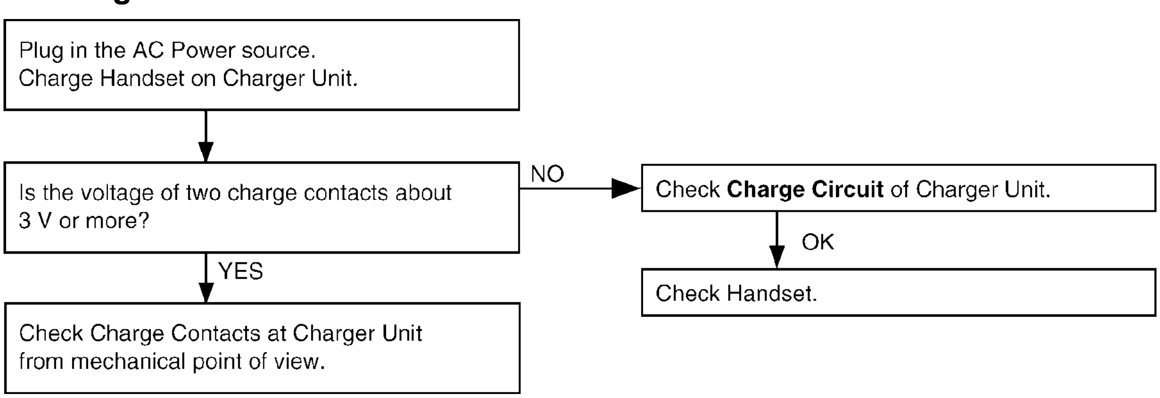


Cross Reference:

Check Power (P.32)

Charge Circuit (P.21)

10.1.4.3. Charger Unit

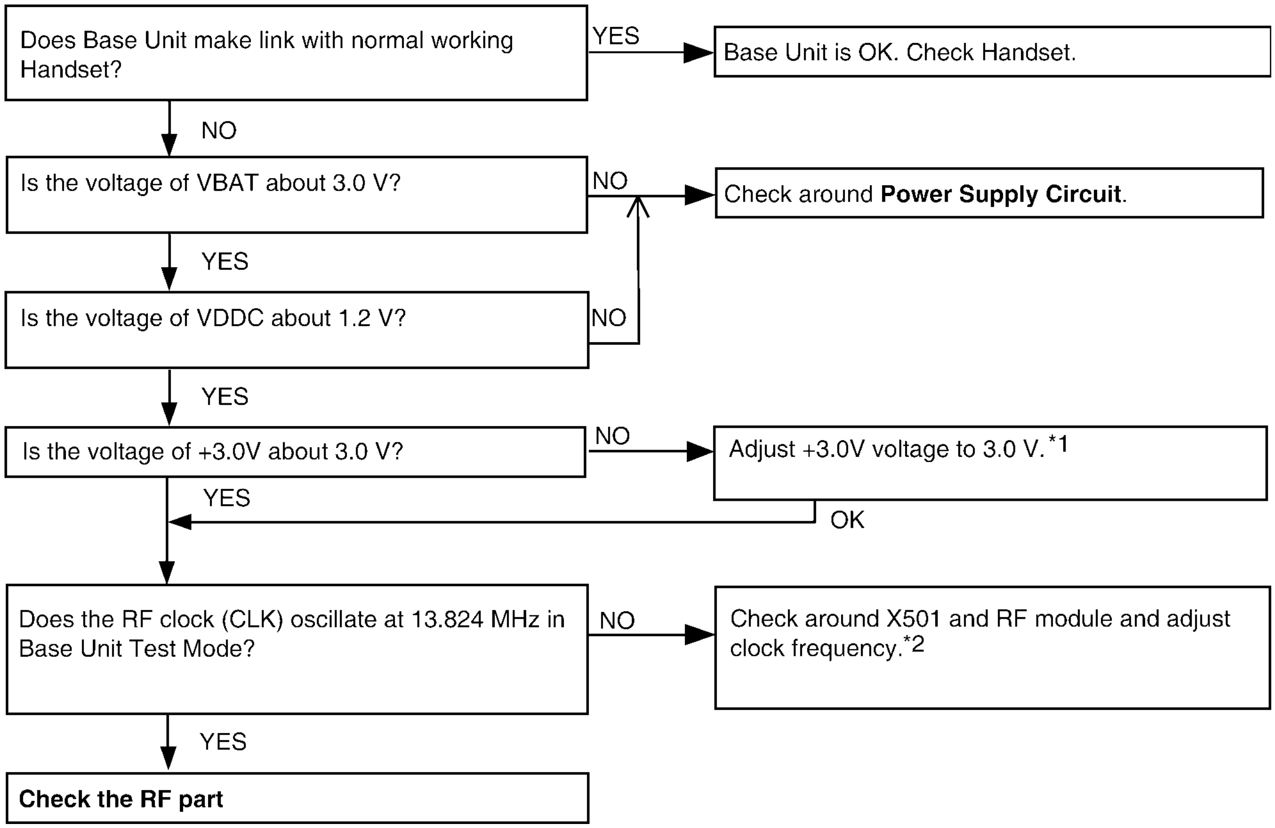


Cross Reference:

Charge Circuit (P.21)

10.1.5. Check Link

10.1.5.1. Base Unit



Cross Reference:

Power Supply Circuit/Reset Circuit (P.12)

Check the RF part (P.37)

Note:

*1 How to adjust +3.0V:

Execute the command "VDA"

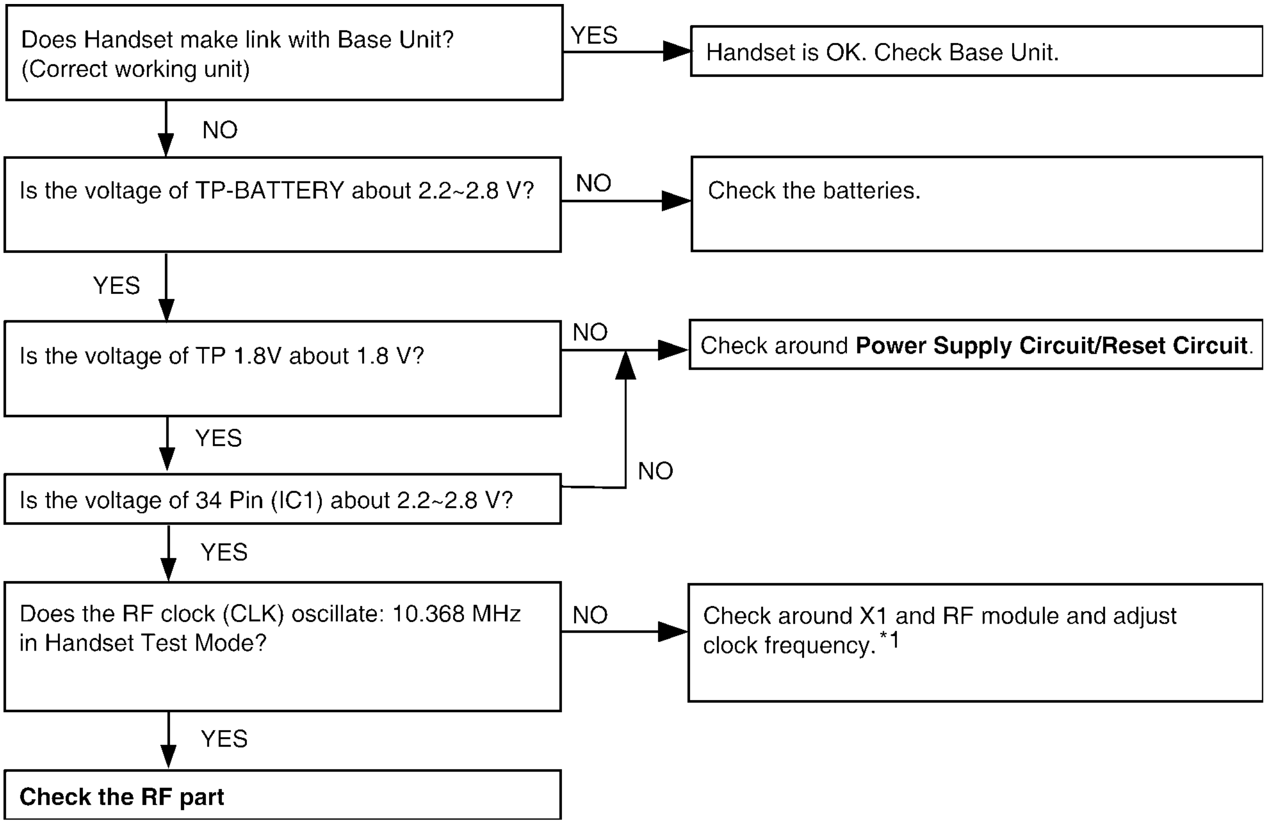
Refer to **Things to Do after Replacing IC or X'tal** (P.54) for Base Unit.

*2 How to adjust the frequency of X501:

To see the frequency, execute the command “SFR“, then check the TP_CKM (IC501-57pin).

To adjust frequency, send command “SFR ␣○○␣○○“ until the frequency counter becomes13.824 MHZ±55HZ.

10.1.5.2. Handset



Cross Reference:

Power Supply Circuit/Reset Circuit (P.20)

Check the RF part (P.37)

Note:

*1 How to adjust the frequency of X1:

To see the frequency, execute the command “SFR“, then check the TP_CKM (IC1-46pin).

To adjust frequency, send command “SFR ␣○○␣○○“ until the frequency counter becomes10.368 MHz±55HZ.

Refer to **Things to Do after Replacing IC or X'tal** (P.55) for Handset.

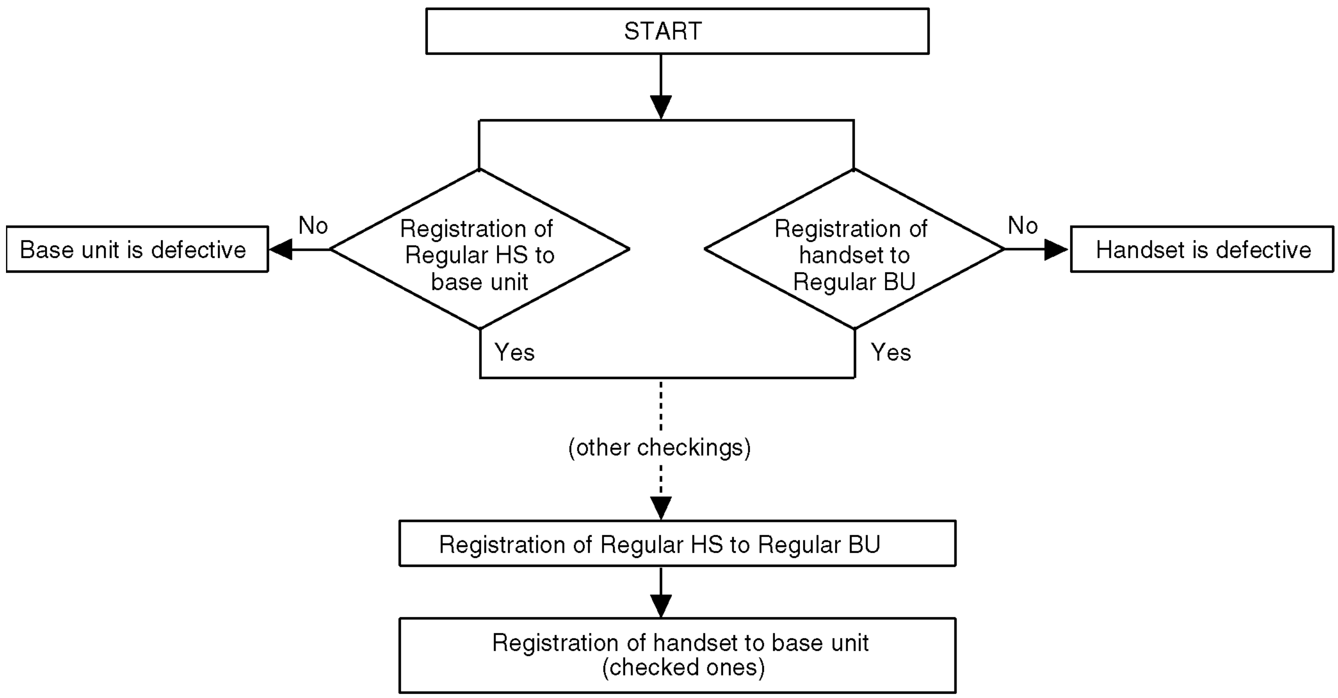
10.1.6. Check the RF part

10.1.6.1. Finding out the Defective part

1. Prepare Regular HS(*1) and Regular BU(*2).
2. a. Re-register regular HS (Normal mode) to base unit (to be checked).
   If this operation fails in some ways, the base unit is defective.
   b. Re-register handset (to be checked) to regular BU (Normal mode).
   If this operation fails in some ways, the handset is defective.

After All the Checkings or Repairing

1. Re-register the checked handset to the checked base unit, and Regular HS to Regular BU.

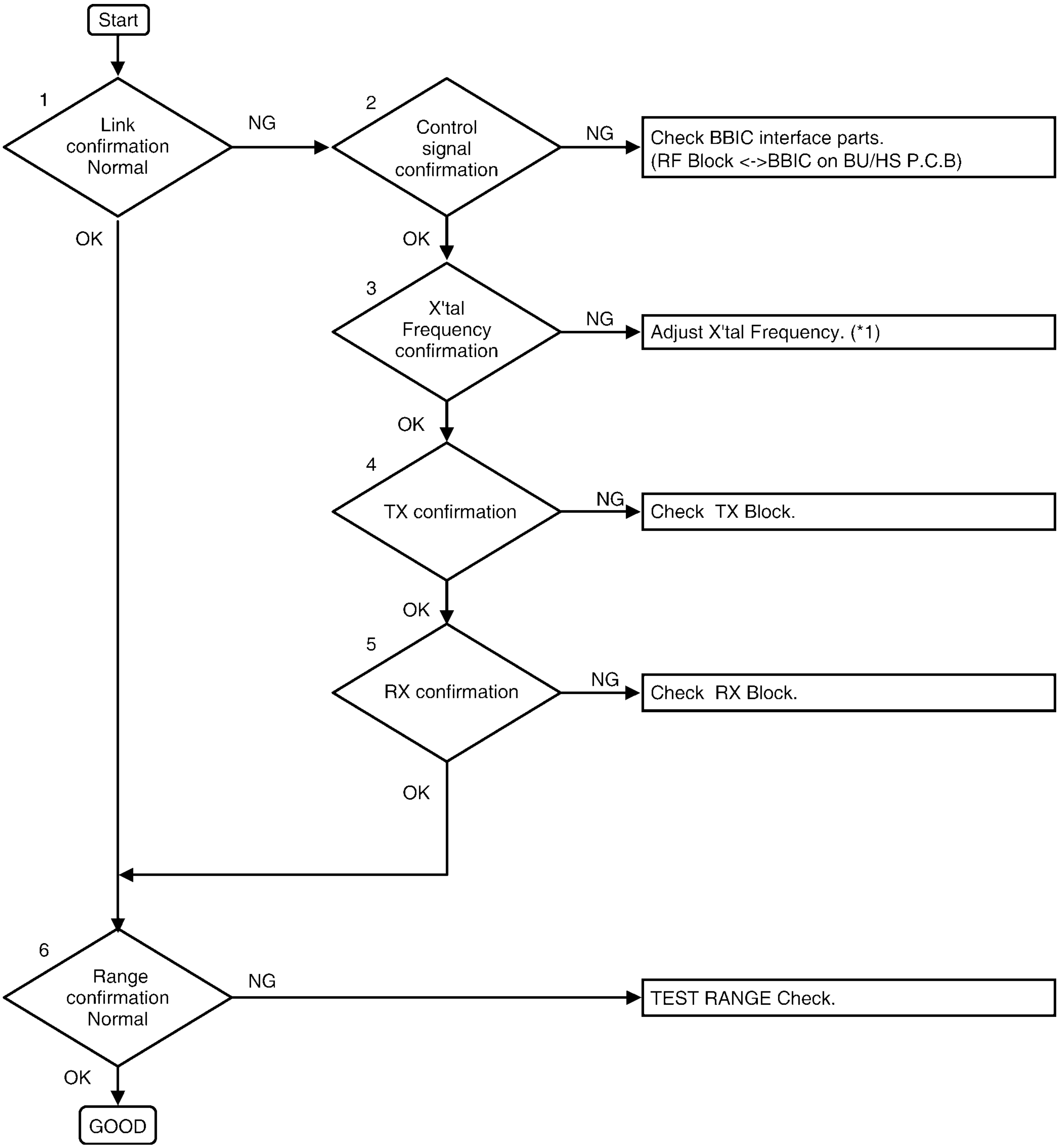


Note:

(*1) HS: Handset
(*2) BU: Base Unit

10.1.6.2. RF Check Flowchart

Each item (1 ~ 6) of RF Check Flowchart corresponds to **Check Table for RF part** (P.39).
Please refer to the each item.



Note:
(*1) Refer to **Check Link** (P.35).

10.1.6.3. Check Table for RF part

No.	Item	BU (Base Unit) Check	HS (Handset) Check
1	Link Confirmation Normal HS, BU Mode [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link.
2	X'tal Frequency confirmation HS, BU Mode: [Adjustment]	Check X'tal Frequency. (13.824000 MHz ±100 Hz)	Check X'tal Frequency. (10.368000 MHz ±100 Hz)
3	TX confirmation Regular HS (BU) Mode: [Test RX Mode] BU (HS) Mode: [Test TX_Burst Mode]	1. Place Regular HS 15 cm away from a checked BU. 2. Confirm "TXDATA" waveform of BU (*1) and “RXDATA“ waveform of Regular HS by Digital Oscilloscope.	1. Place Regular BU 15 cm away from a checked HS. 2. Confirm "TXDATA" waveform of HS (*2) and "RXDATA" waveform of Regular BU by Digital Oscilloscope.
4	RX confirmation Regular HS (BU) Mode: [Test TX_Burst Mode] BU (HS) Mode: [Test RX Mode]	1. Place Regular HS 15 cm away from a checked BU. 2. Confirm "RXDATA" waveform of BU (*1) and “TXDATA“ waveform of Regular HS by Digital Oscilloscope.	1. Place Regular BU 15 cm away from a checked HS. 2. Confirm "RXDATA" waveform of HS (*2) and "TXDATA" waveform of Regular BU by Digital Oscilloscope.
5	Range Confirmation Normal HS, BU Mode: [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link. 3. Compare the range of the BU (being checked) with that of the Regular BU.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link. 3. Compare the range of the HS (being checked) with that of the Regular HS.

Note:

(*1) **Adjustment Standard (Base Unit)** (P.51)

(*2) **Adjustment Standard (Handset)** (P.53)

10.1.6.4. TEST RANGE Check

Circuit block which range is defective can be found by the following check.

Item	BU (Base Unit) Check	HS (Handset) Check
Range Confirmation TX TEST (TX Power check) HS, BU setting Checked unit: Low TX power (*1) Regular unit: High TX power (*1)	1. Register Regular HS to BU (to be checked). 2. Set TX Power of the BU and the Regular HS according to CHART1. 3. At distance of about 20m between HS and BU, Link OK = TX Power of the BU is OK. No Link = TX Power of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set TX Power of the HS and the Regular BU according to CHART1. 3. At distance of about 20m between HS and BU, Link OK = TX Power of the HS is OK. No Link = TX Power of the HS is NG.
Range Confirmation RX TEST (RX sensitivity check) HS, BU setting Checked unit: High TX power (*1) Regular unit: Low TX power (*1)	1. Register Regular HS to BU (to be checked). 2. Set TX Power of the BU and the Regular HS according to CHART1. 3. At distance of about 20m between HS and BU, Link OK= RX Sensitivity of the BU is OK. No Link = RX Sensitivity of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set TX Power of the Checking HS and the Regular BU according to CHART1. 3. At distance of about 20m between HS and BU, Link OK= RX Sensitivity of the HS is OK. No Link = RX Sensitivity of the HS is NG

CHART1: Setting of TX Power and RX Sensitivity in Range Confirmation TX TEST, RX TEST

	BU (to be checked)	Regular_HS
	TX Power	TX Power
BU (Base Unit) TX Power Check	Low	High
BU (Base Unit) RX Sensitivity Check	High	**Low**

	HS (to be checked)	Regular_BU
	TX Power	TX Power
HS (Handset) TX Power Check	Low	High
HS (Handset) RX Sensitivity Check	High	**Low**

Note:

(*1) Refer to **Commands** (P.50).

10.1.7. Registering a Handset to the Base Unit

The supplied handset and base unit are pre-registered. If for some reason the handset is not registered to the base unit, re-register the

handset.

1 **Handset:**
  [MENU]
2 **[▼]**/**[▲]**: "Ajuste inicial" → **[OK]**
3 **[▼]**/**[▲]**: "Registrar" → **[OK]**
4 **[▼]**/**[▲]**: "Registrar Auric." → **[OK]**
5 **Base unit:**
  - If all registered handsets start ringing, press the same button to stop. Then repeat this step.
  - The next step must be completed within 90 seconds.
6 **Handset:**
  Press **[OK]**, then wait until a long beep sounds.

Note:
- While registering, "**En La Base Modo registro**" is displayed on all registered handsets.
- When you purchase an additional handset, refer to the additional handset's installation manual for registration.

10.1.8. Deregistering a Handset

A handset can cancel its own registration (or the registration of another handset) that is stored to the base unit. This allows the handset to end its wireless connection with the system.

1 **[MENU]**
2 **[▼]**/**[▲]**: "Ajuste inicial" → **[OK]**
3 **[▼]**/**[▲]**: "Registrar" → **[OK]**
4 **[▼]**/**[▲]**: "Des-registrado" → **[OK]**
5 **[3][3][5]** → **[OK]**
6 Select the handset(s) you want to cancel by pressing the desired handset number (**[1]**-**[6]**). → **[OK]**
  - The selected handset number(s) flashes.
  - To undo a selection, press the handset number again. The number stops flashing.
7 **[▼]**/**[▲]**: "Sí" → **[OK]**
8 **[OFF]**

10.1.9. Deregistering All Handsets by the Base Unit

Base unit:

1 Press and hold **[LOCATOR/INTERCOM]** again until a long beep sounds.

Important:
When deregistering all handsets by the base unit, the registration information of all handsets in the base unit is erased.
However the registration information in each handset will still remain.

10.1.10. Check Handset Transmission

Check MIC of handset.

↓

Check handset Tx in **Signal Route**.

Cross Reference:
Signal Route (P.23)

10.1.11. Check Handset Reception

Check speaker of handset.

↓

Check handset Rx in **Signal Route**.

Cross Reference:
Signal Route (P.23)

Note:
When checking the RF part, Refer to **Check the RF part** (P.37).

10.1.12. Check Caller ID

BASE UNIT

Did bell ring? (Message indicator blinks)

NO → Check bell signal detection in **Telephone Line Interface**.

YES ↓

Check **Calling Line Identification (Caller ID)/ Call Waiting Caller ID.**

Cross Reference:
Telephone Line Interface (P.14)
Calling Line Identification (Caller ID)/Call Waiting Caller ID (P.16)

Note:
- Make sure the format of the Caller ID service of the Telephone company that the customer subscribes to.
- It is also recommended to confirm that the customer is really a subscriber of the service.

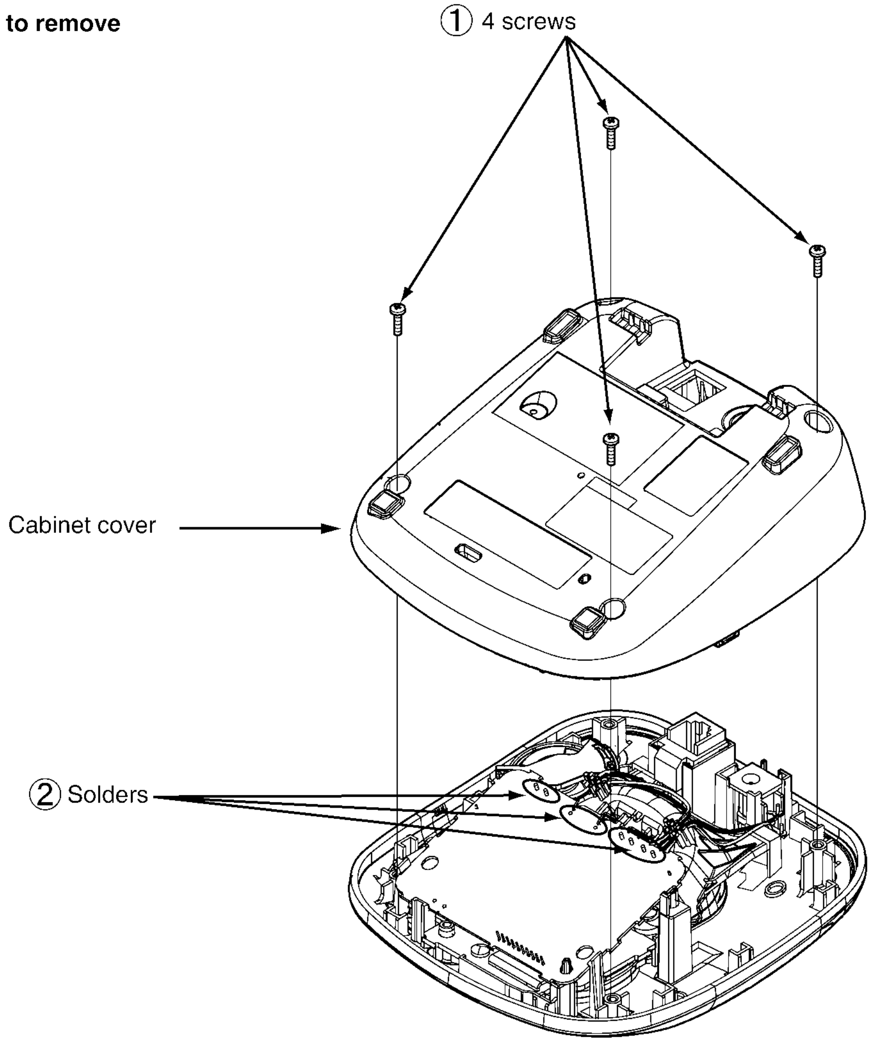
11 Disassembly and Assembly Instructions

11.1. Disassembly Instructions

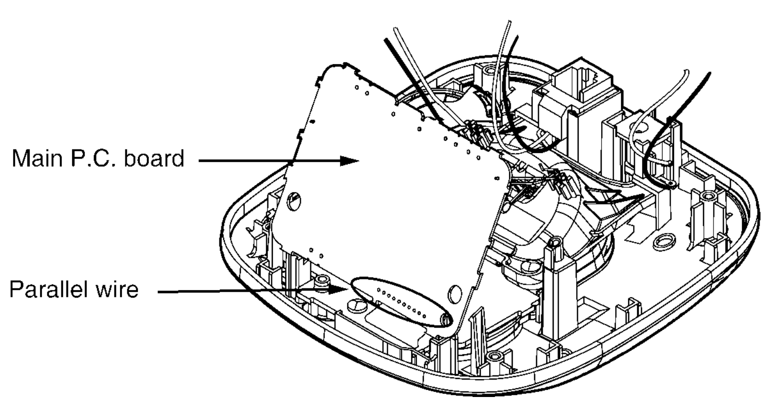
11.1.1. Base Unit

① **Remove the 4 screws to remove the cabinet cover.**

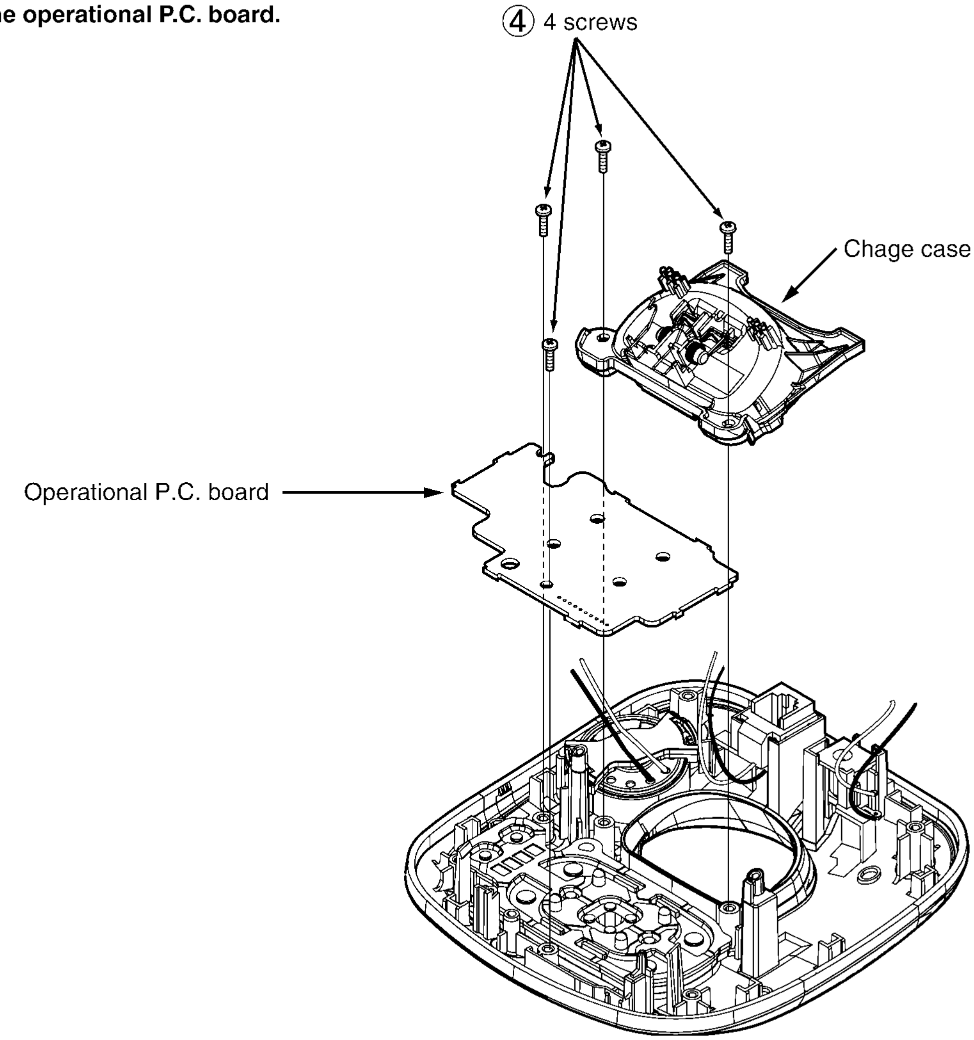
② **Remove the solders.**



③ **Remove the parallel wire to remove the main P.C. board.**

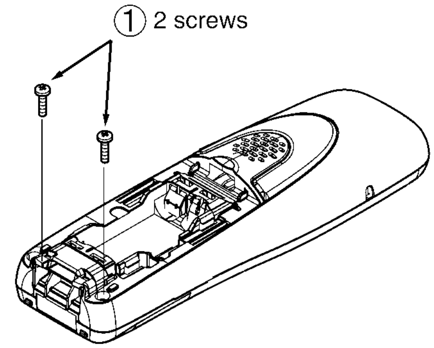


④ Remove the 4 screws to remove the charge case and the operational P.C. board.

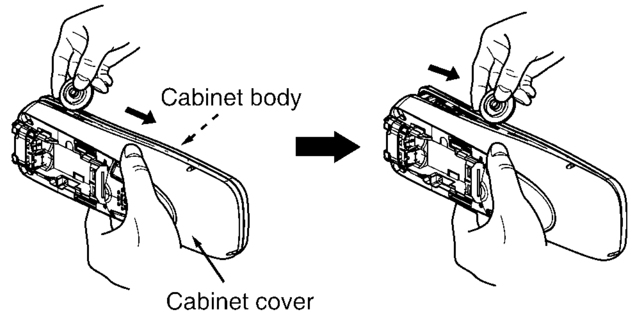


11.1.2. Handset

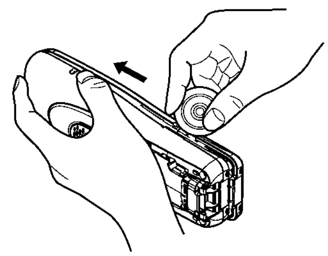
(1) Remove the 2 screws.



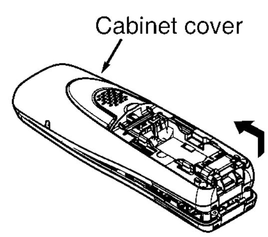
(2) Insert a JIG (PQDJ10006Y) between the cabinet body and the cabinet cover, then pull it along the gap to open the cabinet.



(3) Likewise, open the other side of the cabinet.



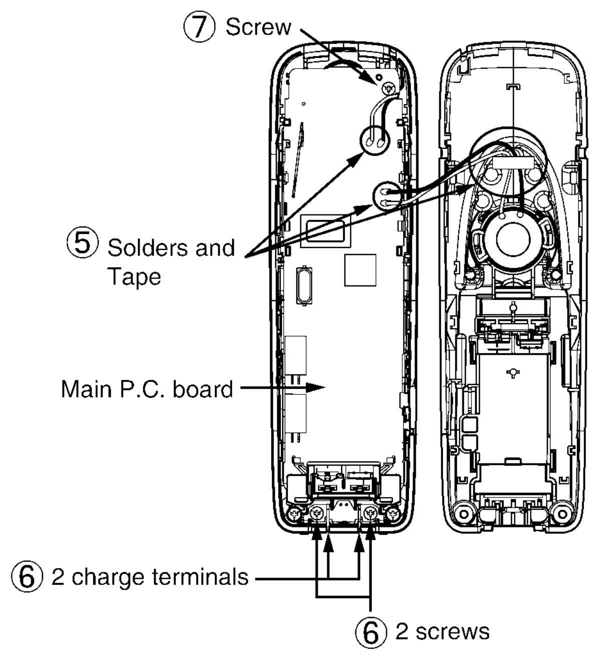
(4) Remove the cabinet cover by pushing it upward.



(5) Remove the solders and tape.

(6) Remove the 2 screws to remove the 2 charge terminals.

(7) Remove the screw to remove the main P. C. board.

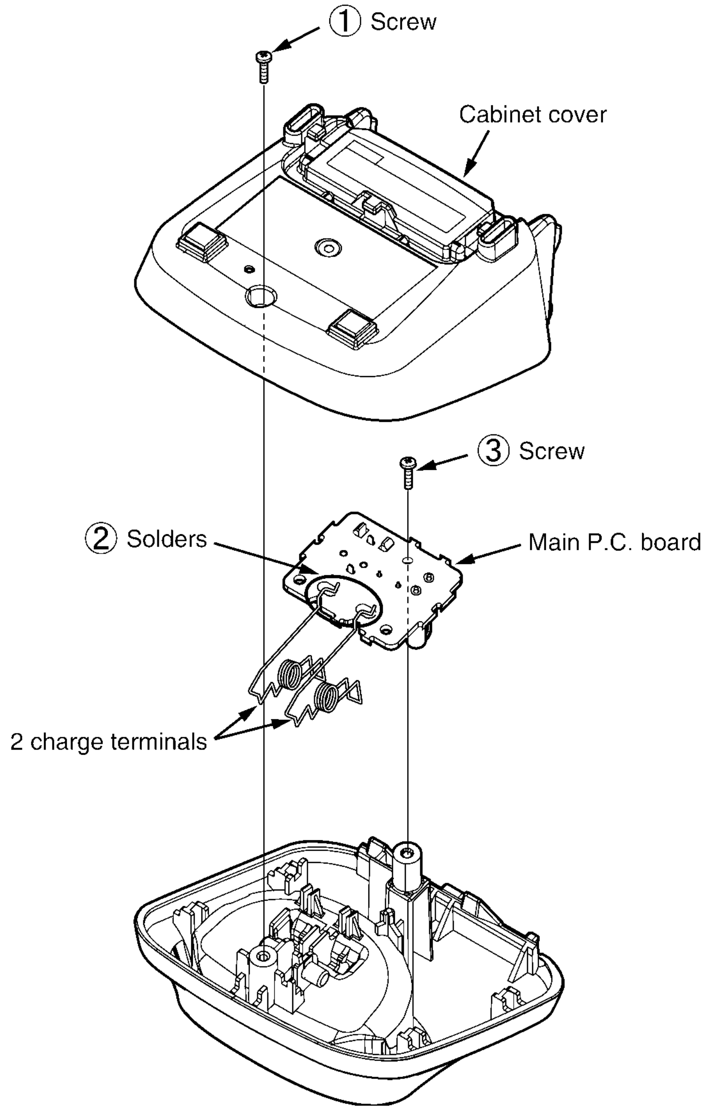


11.1.3. Charger Unit

① **Remove the screw to remove the cabinet cover.**

② **Remove the solders to remove the 2 charge terminals.**

③ **Remove the screw to remove the main P.C. board.**

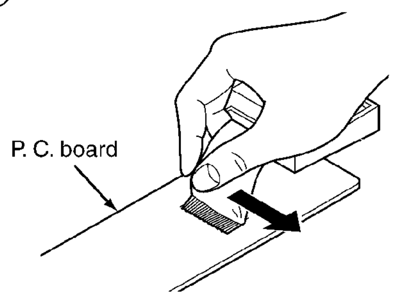


11.2. How to Replace the Handset LCD

Note:

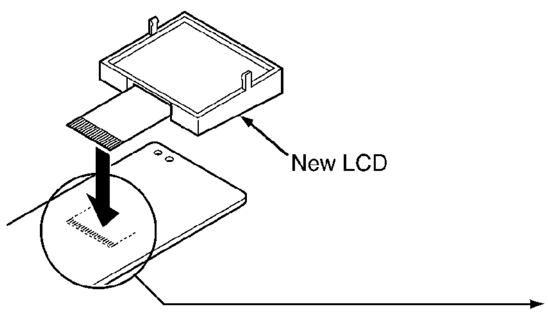
The illustrations are simplified in this page.
They may differ from the actual product.

①

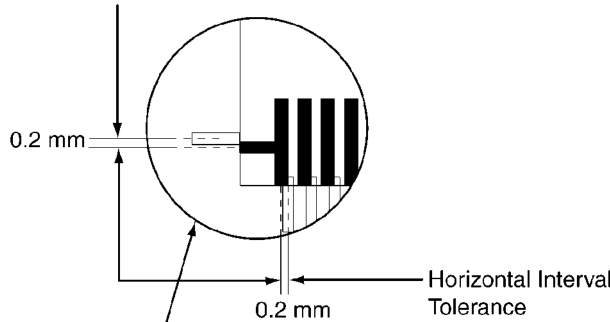


Peel off the FFC (Flexible Flat Cable) from the LCD, in the direction of the arrow. Take care to ensure that the foil on the P.C. board is not damaged.

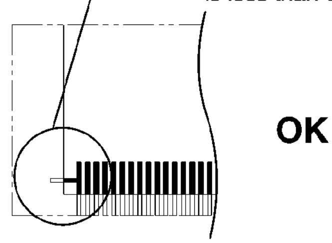
②

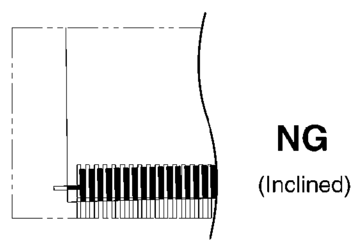


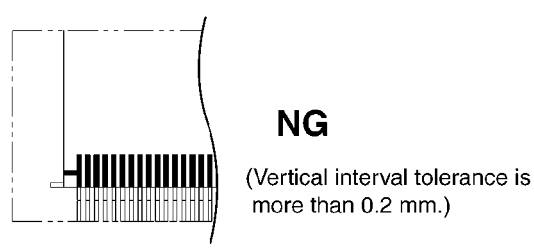
Fit the heatseal of a new LCD.

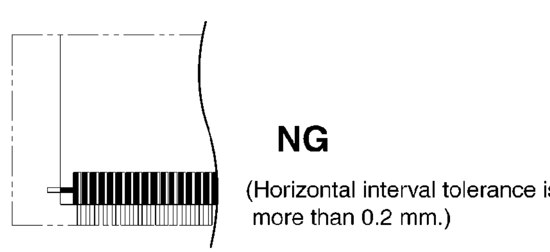


If interval tolerance between center lines is less than 0.2 mm, it is o.k.

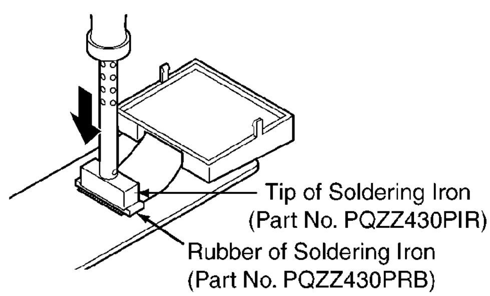








③



Heatweld with the tip of the soldering iron about 5 to 8 seconds
(in case of 60W soldering iron).

12 Measurements and Adjustments

This chapter explains the measuring equipment, the JIG connection, and the PC setting method necessary for the measurement in **Troubleshooting Guide** (P.31)

12.1. Equipment Required

- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope.
- Frequency counter: It must be precise enough to measure intervals of 1 Hz (precision; ±4 ppm)
  Hewlett Packard, 53131A is recommended.
- DECT tester: Rohde & Schwarz, CMD 60 is recommended.
  This equipment may be useful in order to precisely adjust like a mass production.

12.2. The Setting Method of JIG

<Preparation>

- Serial JIG cable: PQZZ1CD300E*
- PC which runs in DOS mode
- **Batch file CD-ROM** for setting: PNZZTG4021LA

Note:

*: If you have the JIG Cable for TCD500 series (PQZZ1CD505E), change the following values of resistance. Then you can use it as a JIG Cable for both TCD300 and TCD500 series. (It is an upper compatible JIG Cable.)

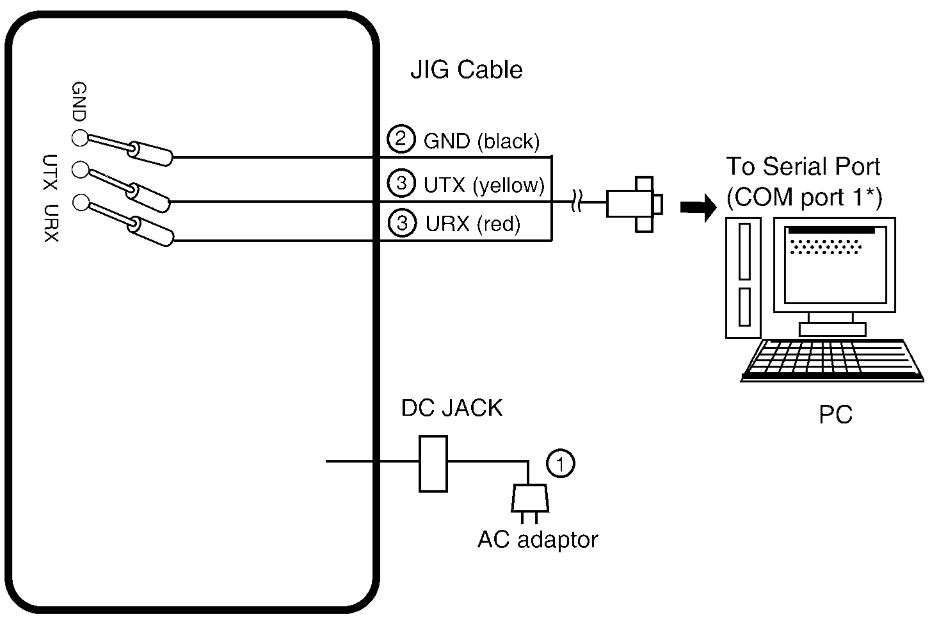
Resistor	Old value (kΩ)	New value (kΩ)
R2	22	3.3
R3	22	3.3
R4	22	4.7
R7	4.7	10

12.2.1. Connections (Base Unit)

① Connect the AC adaptor.

② Connect the JIG Cable GND (black).

③ Connect the JIG Cable RX (red) and TX (yellow).



Base unit P. C. board

Note:

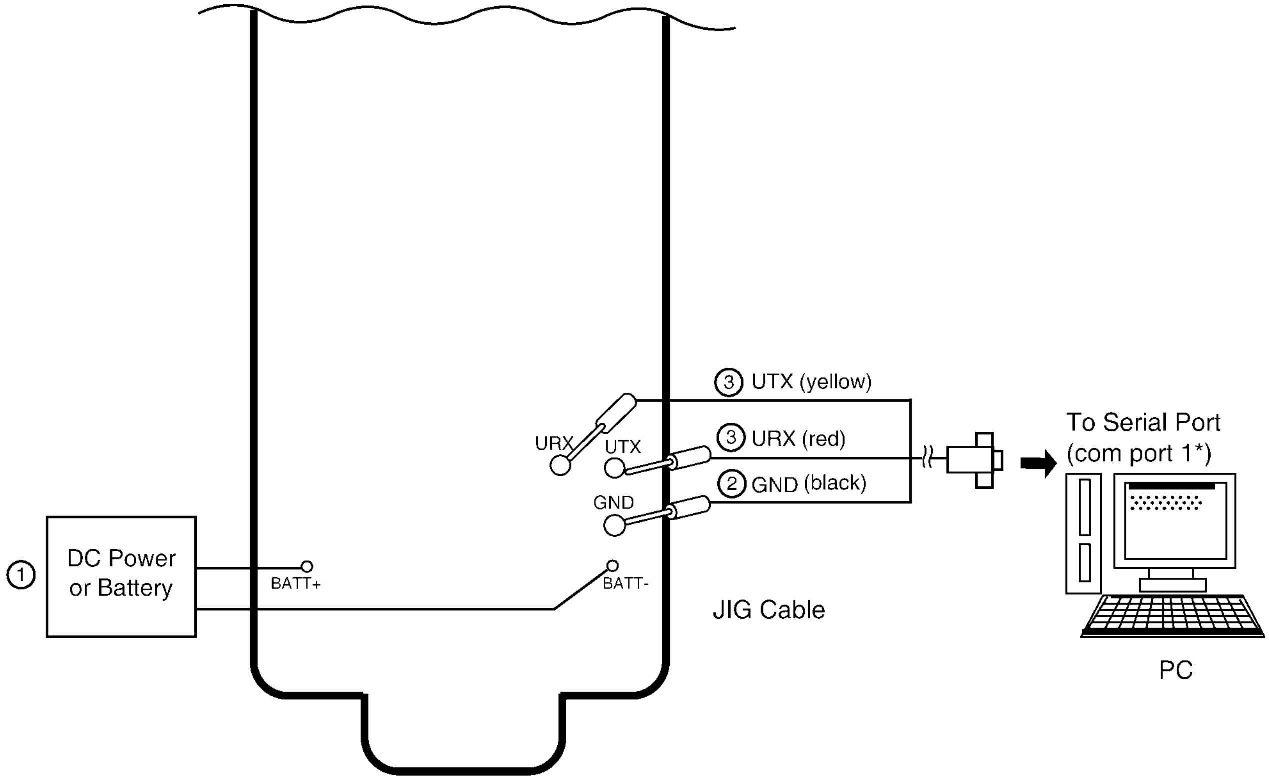
*: COM port names may vary depending on what your PC calls it.

12.2.2. Connections (Handset)

① Connect the DC Power or Battery to BATT+ and BATT-.

② Connect the JIG cable GND (black) to GND.

③ Connect the JIG cable UTX (yellow) to UTX and URX (red) to URX.



Handset P. C. board

Note:

*: COM port names may vary depending on what your PC calls it.

12.2.3. How to install Batch file into P.C.

1. Insert the Batch file CD-ROM into CD-ROM drive and copy PNZZTG**** folder to your PC (example: D drive).

2. Open an MS-DOS mode window.

<Example for Windows>

On your computer, click **[Start]**, select **Programs** (**All Programs** for Windows XP/Windows Server 2003), then click
MS-DOS Prompt. (for Windows 95/Windows 98)
Or
Accessories-MS-DOS Prompt. (for Windows Me)
Or
Command Prompt. (for Windows NT 4.0)
Or
Accessories-Command Prompt.
(for Windows 2000/Windows XP/Windows Server 2003)

3. At the DOS prompt, type "**D:**" (for example) to select the drive, then press the **Enter** key.

4. Type "**CD ¥PNZZTG******", then press the **Enter** key.

5. Type "**SET_COM=X**", then press the **Enter** key (**X**: COM port number used for the serial connection on your PC).

6. Type "**READID**", then press the **Enter** key.
   - If any error messages appear, change the port number or check the cable connection.
   - If any value appear, go to next step.

7. Type "**DOSKEY**", then press the **Enter** key.

<Example>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PNZZTG****
D: ¥PNZZTG**** >SET_COM=X
D: ¥PNZZTG****>READID
00 52 4F A8 A8
D: ¥PNZZTG****>DOSKEY
D: ¥PNZZTG****>_
```

<Example: error happens>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PNZZTG****
D: ¥PNZZTG**** >SET_COM=X
D: ¥PNZZTG****>READID
  CreateFile error
ERROR 10: Can't open serial port
D: ¥PNZZTG ****>_
```

Note:
- "*****" varies depending on the country or models.

12.2.4. Commands

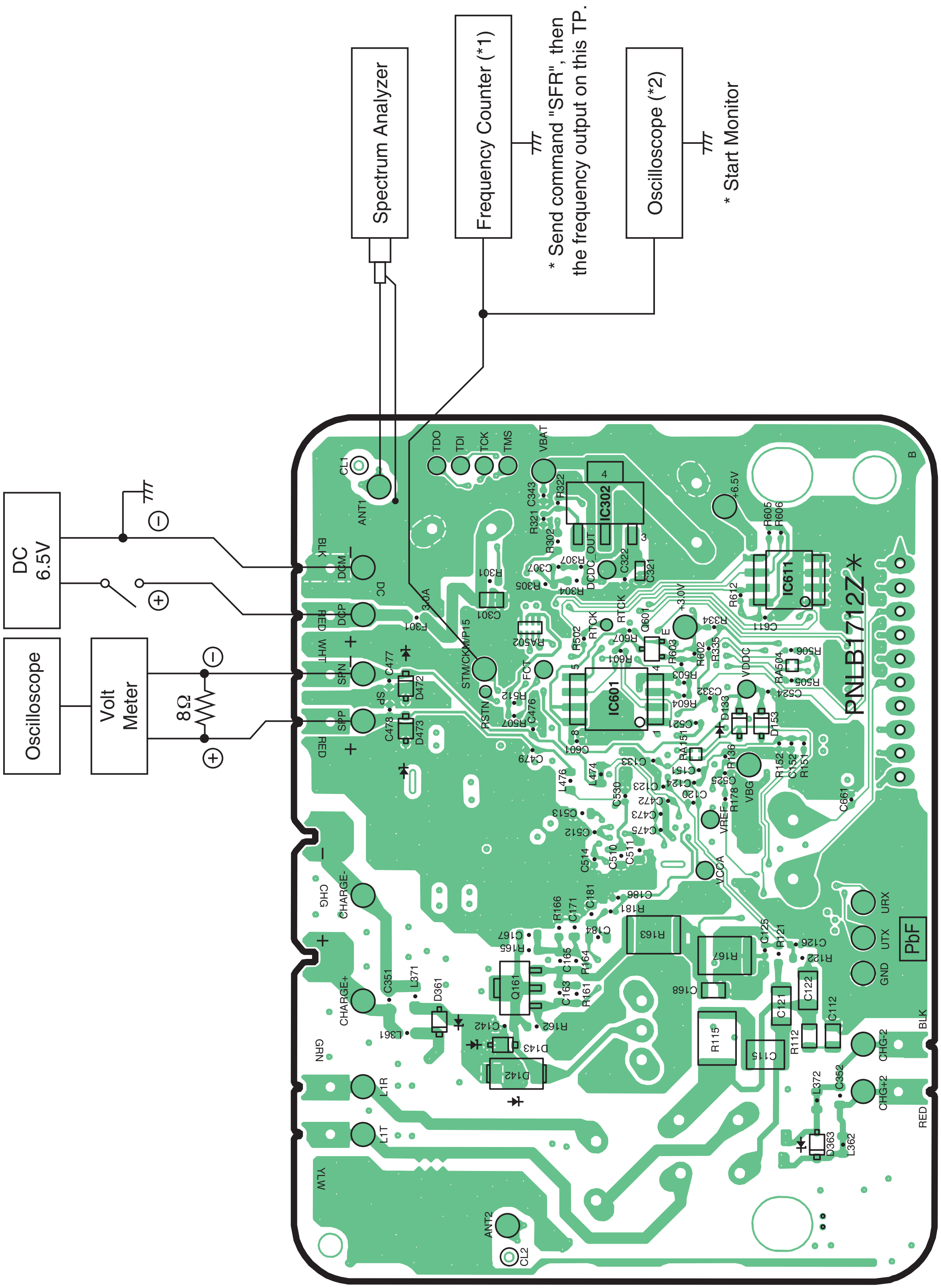
See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
hookoff	Off-hook mode on Base	Type "hookoff".
hookon	On-hook mode on Base	Type "hookon".
getchk	Read checksum	Type "getchk".
wreeprom	Write the data of EEPROM	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.

12.3. Adjustment Standard (Base Unit)

When connecting the simulator equipment for checking, please refer to below.

12.3.1. Bottom View



Note:

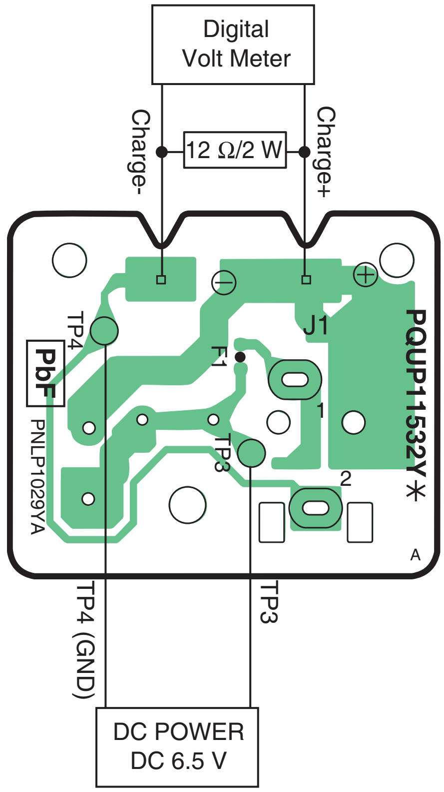
(*1) is referred to No.2 of Check **Check Table for RF part** (P.39)

(*2) is referred to **Power Supply Circuit/Reset Circuit** (P.12)

12.4. Adjustment Standard (Charger Unit)

When connecting the simulator equipment for checking, please refer to below.

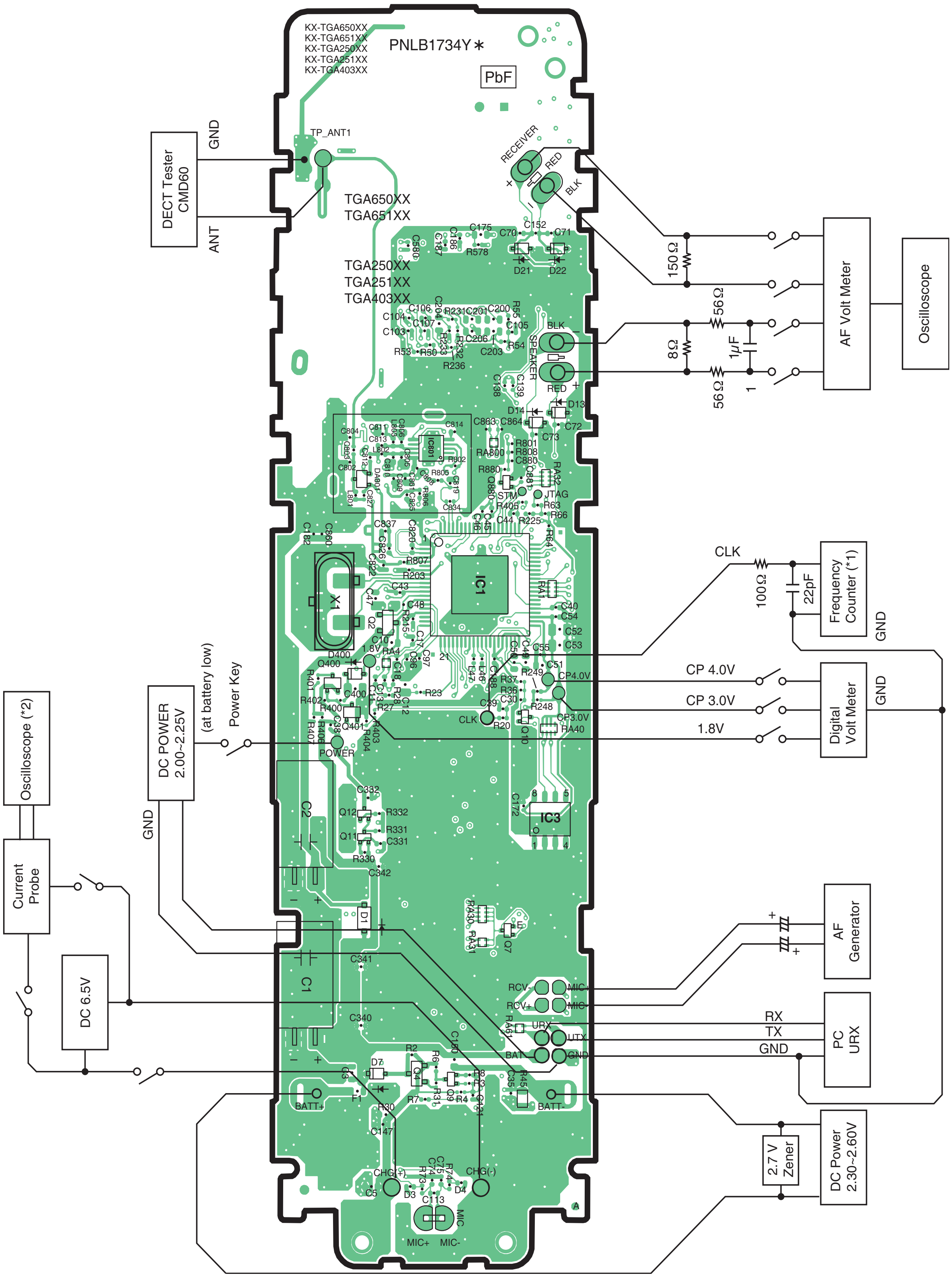
12.4.1. Bottom View



12.5. Adjustment Standard (Handset)

When connecting the simulator equipment for checking, please refer to below.

12.5.1. Component View



Note:

(*1) is referred to No.2 of Check **Check Table for RF part** (P.39)

(*2) is referred to **Power Supply Circuit/Reset Circuit** (P.20)

12.6. Things to Do after Replacing IC or X'tal

If repairing or replacing EEPROM and X'tal, it is necessary to download the required data such as Programming data or adjustment data, etc. in memory.
The set doesn't operate if it is not executed.

12.6.1. How to download the data

12.6.1.1. Base Unit

First, operate the PC setting according to **The Setting Method of JIG(**P.48).
Then download the appropriate data according to the following procedures.

Items		How to download/Required adjustment
EEPROM (IC611)	Adjusted parameter data is stored in memory. (country version batch file, default batch file, etc.)	1) Change the address "0001" of EEPROM to "55" to download the data. 2) Default batch file: Execute the command "default.bat". 3) Country version batch file: Execute the command "TG4021USLArevXXX_YYY.bat". (*1) 4) Clock adjustment
X'tal (X1)	System clock	Clock adjustment data is in EEPROM, adjust the data again after replacing it. 1) Apply 6.5V between DCP ad DCM with DC power. 2) Input Command "sendchar sfr", then you can confirm the current value. 3) Check X'tal Frequency.(13.824 MHz ± 100 Hz). 4) If the frequency is not 13.824 MHz ± 100 Hz, adjust the frequency of CLK executing the command "sendchar sfr xx xx (where xx is the value)" so that the reading of the frequency counter is 13.824000 MHz ± 15 Hz.

Note:

(*1) XXX_YYY: revision number
"XXX", "YYY" vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **The Setting Method of JIG** (P.48).

12.6.1.2. Handset

First, operate the PC setting according to **The Setting Method of JIG** (P.48).
Then download the appropriate data according to the following procedures.

Items		How to download/Required adjustment
EEPROM (IC3)	Adjusted parameter data is stored in memory. (country version batch file, default batch file, etc.)	1) Default batch file: Execute the command “default.bat”. 2) Default batch file (remaining): Execute the command “TGA402USDEFrevXXX_YYY.bat”. (*2) 3) Country version batch file: Execute the command “TGA402USLArevXXX_YYY.bat”. (*2) 4) Clock adjustment 5) 2.35 V setting and battery low detection
Battery Monitor Check	-	1) Apply 2.25 V between BATT+ and BATT-. 2) Execute the command sendchar PAD sendchar LED 0 sendchar CRX 0 1 sendchar AD1 It assumes that the return value is XX. a) 6c ≤ XX ≤ 71: No need to adjust b) XX: 6A ~ 6B: Need to adjust XX: 72 ~ 74: Need to adjust Write AD value of 2.25 V to EEPROM. ex) read data: XX = 6A, write data:YY = 6A read data: XX =73, write data: YY = 73 EEPROM = 0009 (Low Voltage) write “YY“ Execute the command “wreeprom 00 09 01 YY“. EEPROM = 000A (No Voltage) write “YY - 1D“ Execute the command “xwreeprom 00 0A 01 ZZ“. **Note:** No Voltage writing data limit is “00“. c) XX: 00 ~ 69: Reject XX: 75 ~ FF: Reject
Battery Low Confirmation	-	1) Apply 2.40 V between BATT+ and BATT-. 2) Confirm that there is no flashing of Battery Icon. 3) Apply 2.25 V ± 0.08 V between BATT+ and BATT-. 4) Confirm that there is flashing of Battery Icon.
Battery Clock Adjustment (X1)	CLK	1) Apply 2.6 V between BATT+ and BATT- with DC power. 2) Input Command “sendchar sfr“, then you can confirm the current value. 3) Check X’tal Frequency. (10.368 MHz ± 100 Hz). 4) If the frequency is not 10.368 MHz ± 100 Hz, adjust the frequency of CLK execute in the command “sendchar sfr xx xx (where xx is the value)“ so that the reading of the frequency counter is 10.368000 MHz ± 5 Hz.

Note:

(*2) XXX_YYY: revision number

“XXX” and “YYY” vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **The Setting Method of JIG** (P.48).

12.7. Frequency Table

	Ch. (hex)	TX/RX Frequency (MHz)
Channel 0	00	1928.448
Channel 1	01	1926.720
Channel 2	02	1924.992
Channel 3	03	1923.264
Channel 4	04	1921.536

13 Miscellaneous

13.1. How to Replace the Flat Package IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

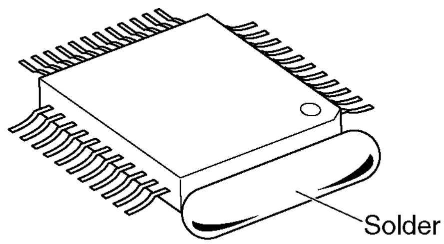
13.1.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700 °F ± 20 °F (370 °C ± 10 °C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux
  Recommended Flux: Specific Gravity → 0.82.
  Type → RMA (lower residue, non-cleaning type)

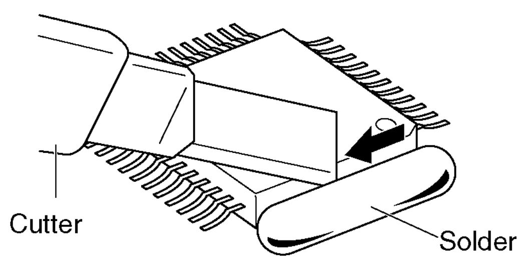
Note: See **About Lead Free Solder (PbF: Pb free)** (P.4)

13.1.2. How to Remove the IC

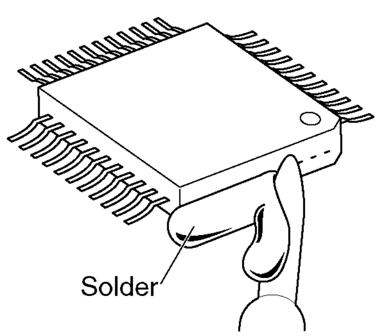
1. Put plenty of solder on the IC pins so that the pins can be completely covered.
   Note:
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



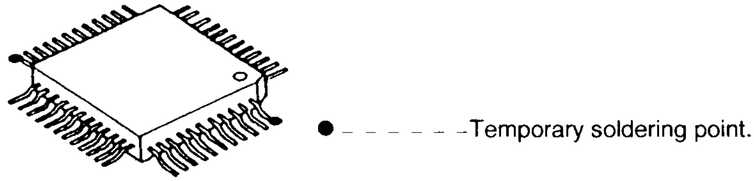
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the board with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

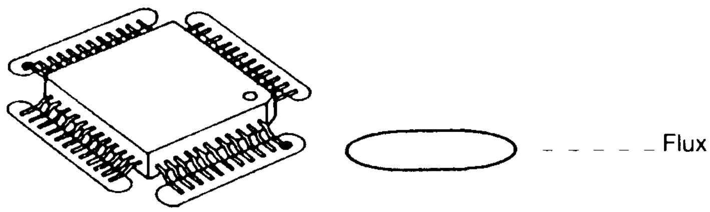
13.1.3. How to Install the IC

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

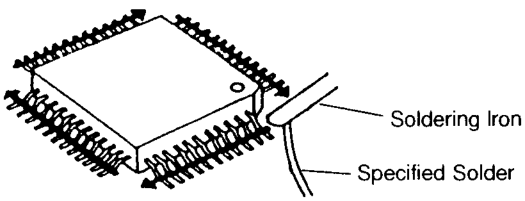


*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux to all pins of the FLAT PACKAGE IC.

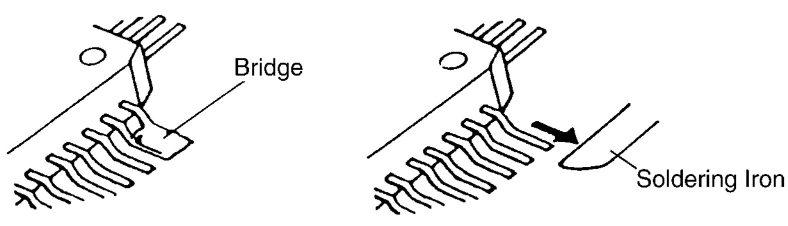


3. Solder the pins, sliding the soldering iron in the direction of the arrow.



13.1.4. How to Remove a Solder Bridge

1. Lightly resolder the bridged portion.
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



13.2. How to Replace the Shield Case

13.2.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)
  Note:
  We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Hot Air Desoldering Tool
  Temperature: 608°F ± 68°F (320°C ± 20°C)

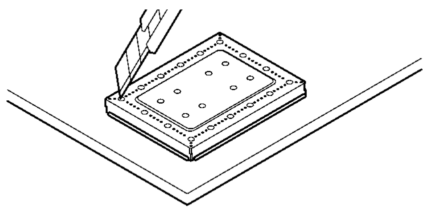
13.2.2. Caution

- To replace the IC efficiently, choose the right sized nozzle of the hot air desoldering tool that matches the IC package.
- Be careful about the temperature of the hot air desoldering tool not to damage the PCB and/or IC.

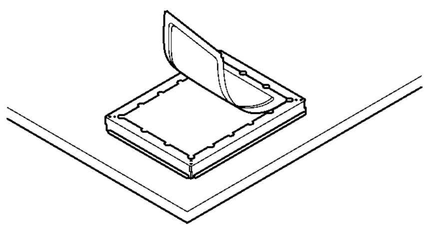
13.2.3. How to Remove the Shield Case

Note:
If you don’t have special tools (ex. Hot air disordering tool), conduct the following operations.

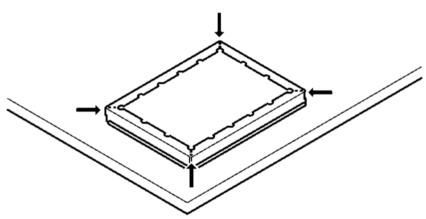
1. Cut the case along perforation.



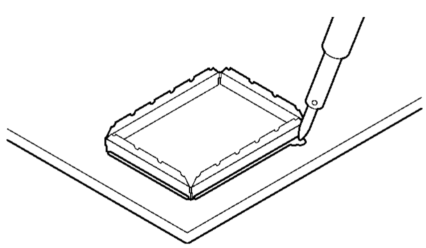
2. Remove the cut part.



3. Cut the four corners along perforation.



4. Remove the reminds by melting solder.

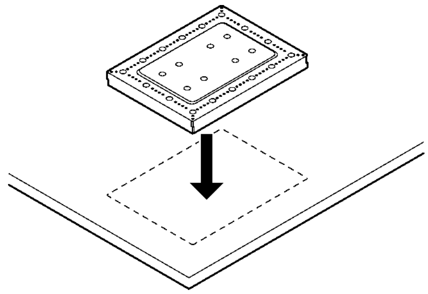


13.2.4. How to Install the Shield Case

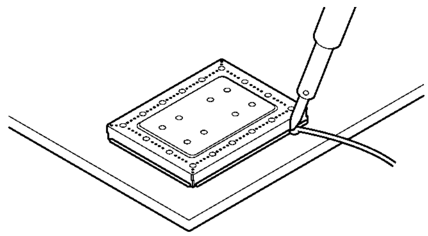
Note:

- If you don’t have special tools (ex. Hot air disordering tool), conduct the following operations.
- Shield case’s No. : PNMC1013Z

1. Put the shield case.



2. Solder the surroundings.



13.3. How to Replace the LLP (Leadless Leadframe Package) IC

Note:

This description is only applied on the model with Shield case.

13.3.1. Preparation

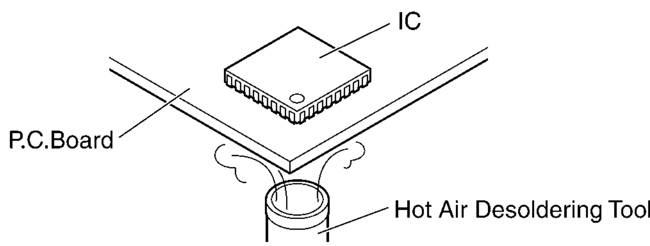
- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700 °F ± 20 °F (370 °C ± 10 °C)
  Note:
  We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Hot Air Desoldering Tool
  Temperature: 608 °F ± 68 °F (320 °C ± 20 °C)

13.3.2. Caution

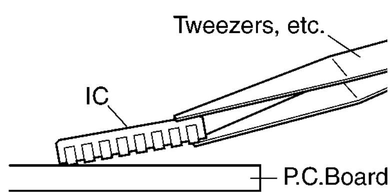
- To replace the IC efficiently, choose the right sized nozzle of the hot air desoldering tool that matches the IC package.
- Be careful about the temperature of the hot air desoldering tool not to damage the PCB and/or IC.

13.3.3. How to Remove the IC

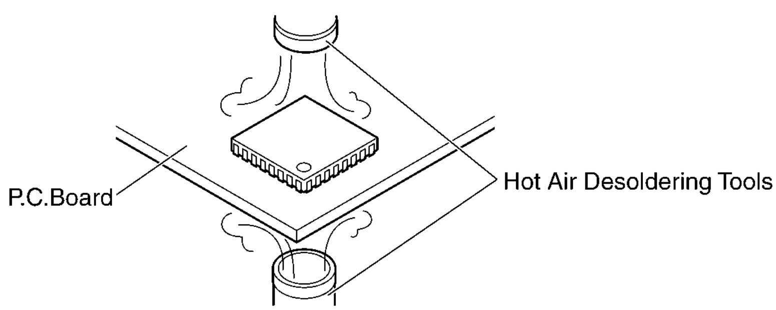
1. Heat the IC with a hot air desoldering tool through the P.C.Board.



2. Pick up the IC with tweezers, etc. when the solder is melted completely.
   Note:
   - Be careful not to touch the peripheral parts with tweezers, etc. They are unstable.



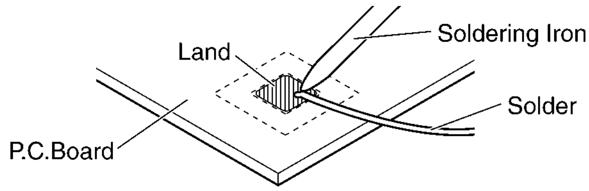
When it is hard to melt the solder completely, heat it with a hot air desoldering tool through the IC besides through the P.C.Board.



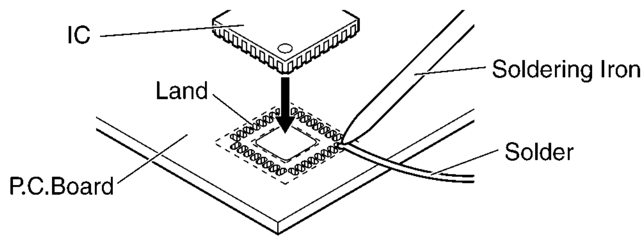
3. After removing the IC, clean the P.C.Board of residual solder.

13.3.4. How to Install the IC

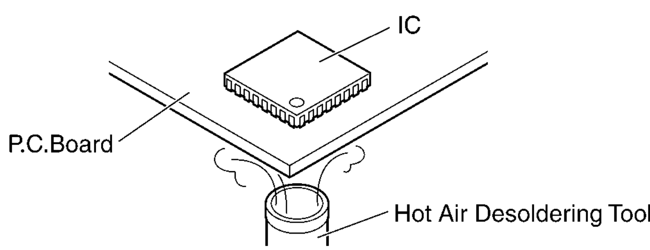
1. Place the solder a little on the land where the radiation GND pad on IC bottom is to be attached.



2. Place the solder a little on the land where IC pins are to be attached, then place the IC.
   Note:
   • When placing the IC, the positioning should be done very carefully.



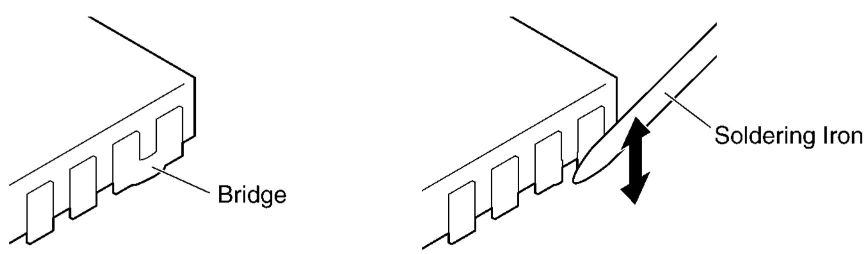
3. Heat the IC with a hot air desoldering tool through the P.C.Board until the solder on IC bottom is melted.
   Note:
   • Be sure to place it precisely, controlling the air volume of the hot air desoldering tool.



4. After soldering, confirm there are no short and open circuits with visual inspection.

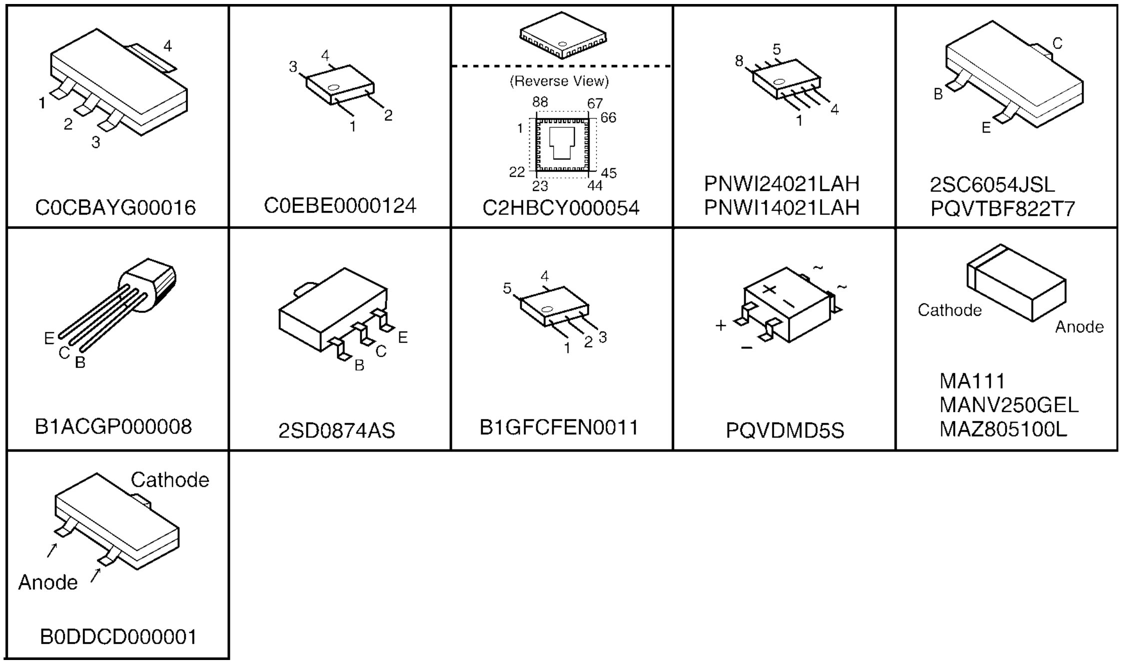
13.3.5. How to Remove a Solder Bridge

When a Solder Bridge is found after soldering the bottom of the IC, remove it with a soldering iron.

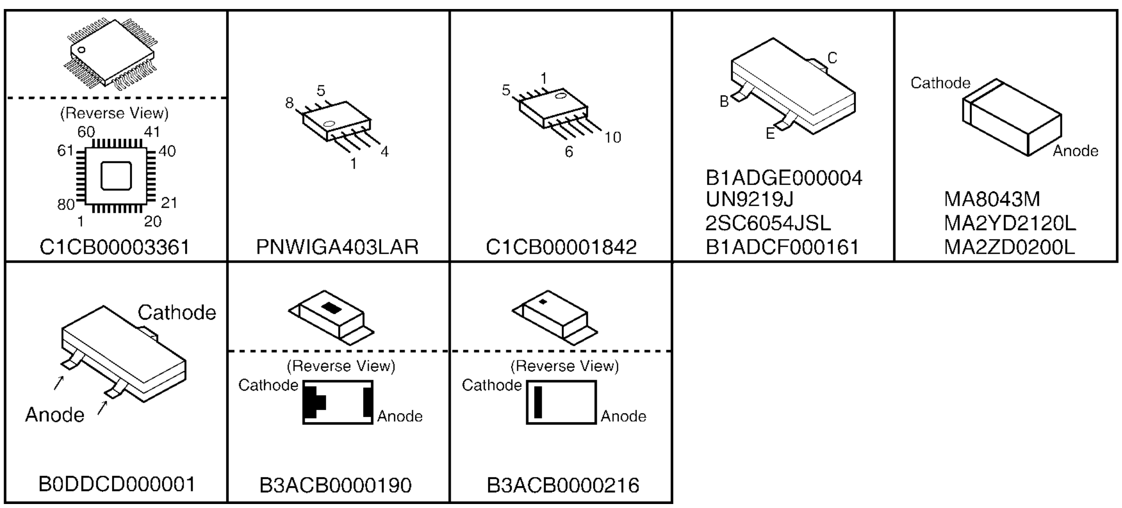


13.4. Terminal Guide of the ICs, Transistors and Diodes

13.4.1. Base Unit



13.4.2. Handset



14 Schematic Diagram

14.1. For Schematic Diagram

14.1.1. Base Unit (Schematic Diagram (Base Unit_Main))

Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. The schematic diagrams may be modified at any time with the development of new technology.

14.1.2. Handset (Schematic Diagram (Handset_Main))

Notes:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams may be modified at any time with the development of new technology.

14.1.3. Charger Unit (Schematic Diagram (Charger Unit))

Notes:

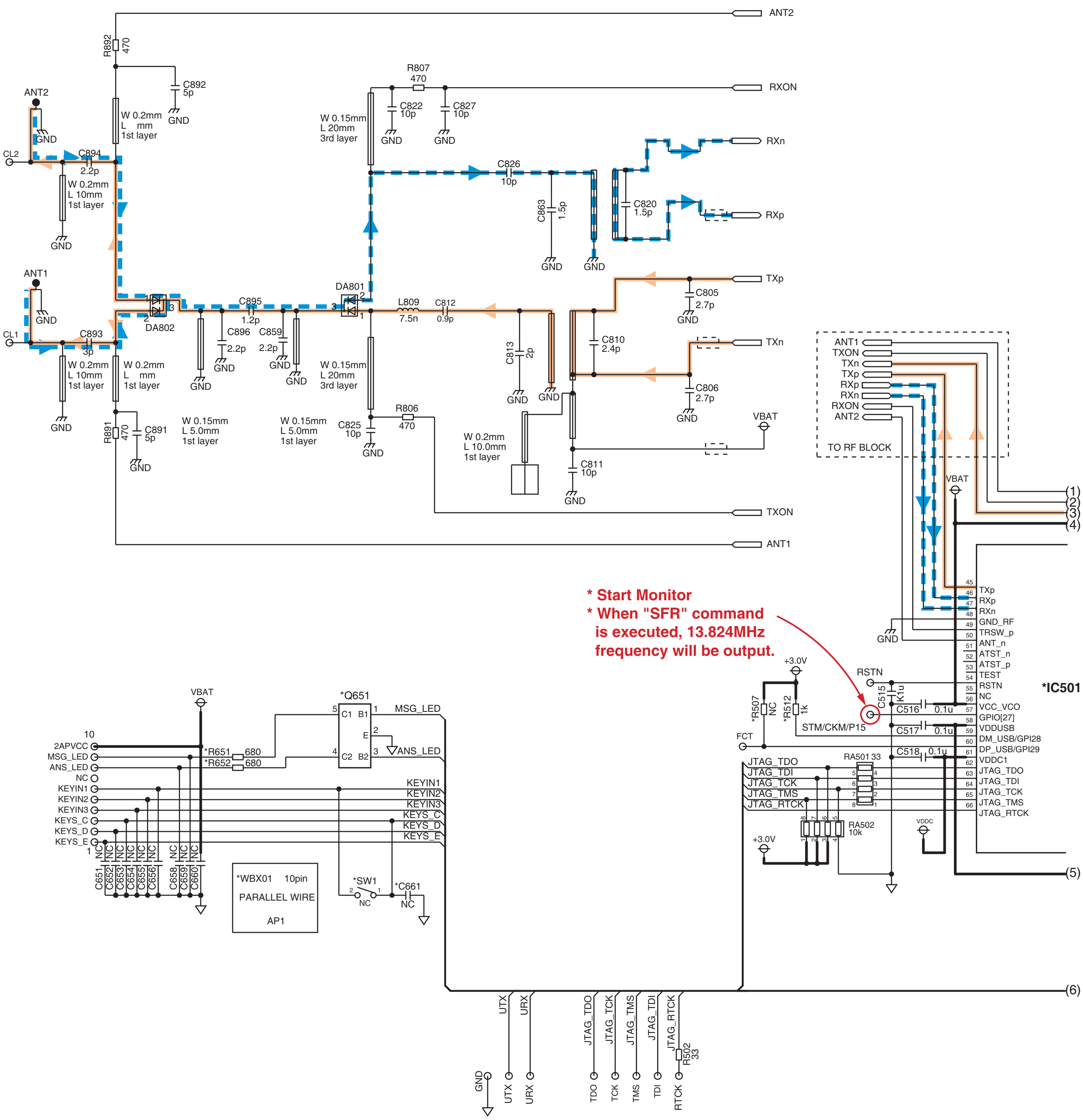
1. DC voltage measurements are taken with voltmeter from the negative voltage line.

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

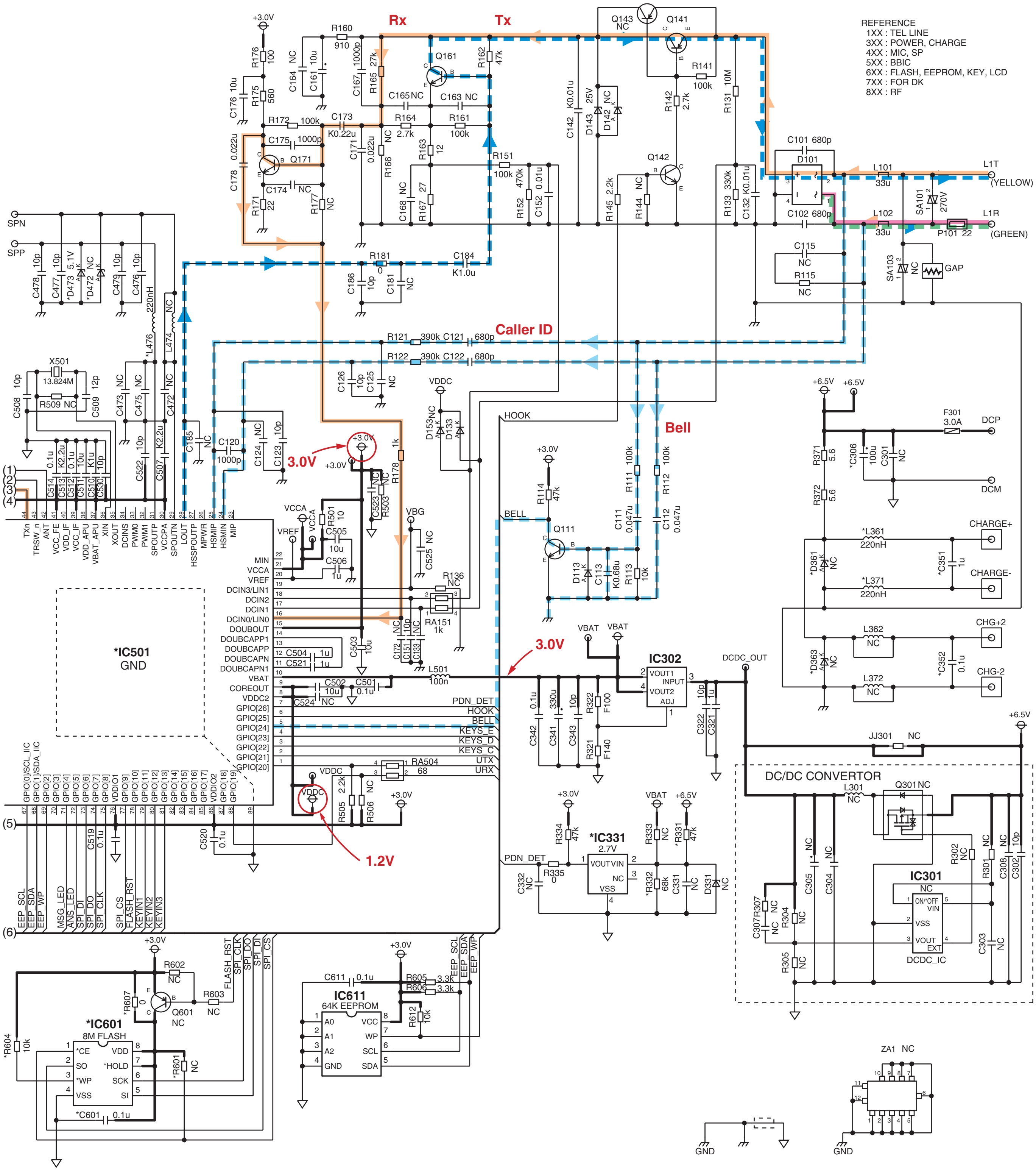
2. The schematic diagrams may be modified at any time with the development of new technology.

Memo

14.2. Schematic Diagram (Base Unit_Main)



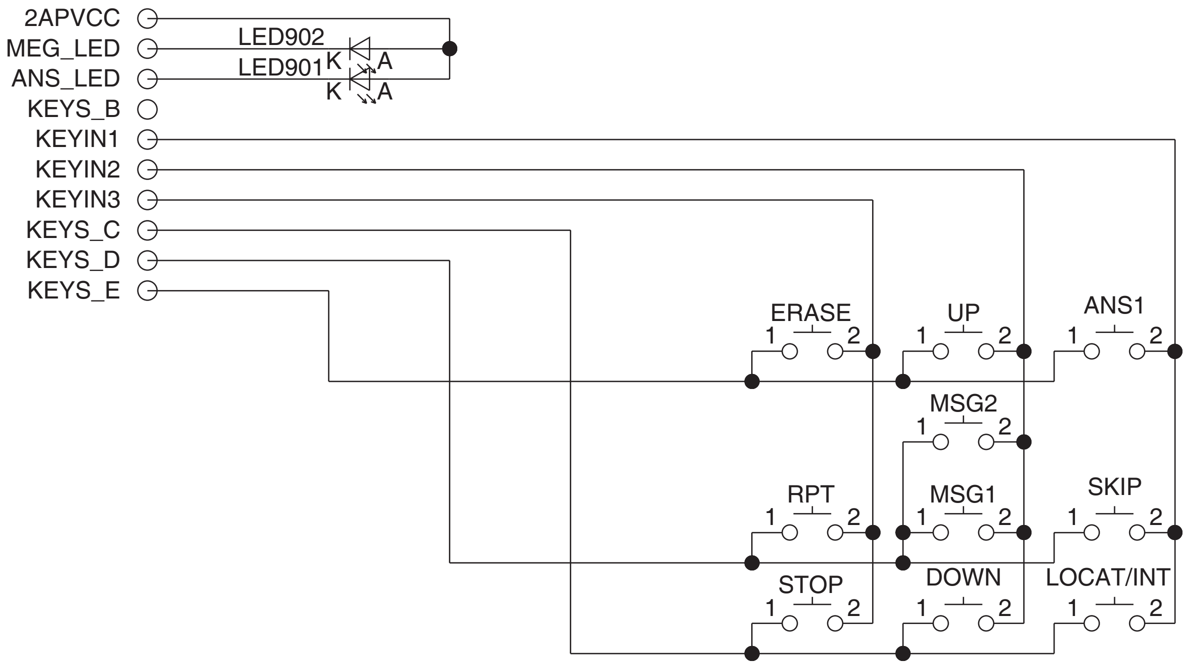
NC: No Components



NC: No Components

KX-TG4021/4022/4023LA SCHEMATIC DIAGRAM (Base Unit_Main)

14.3. Schematic Diagram (Base Unit_Operation)

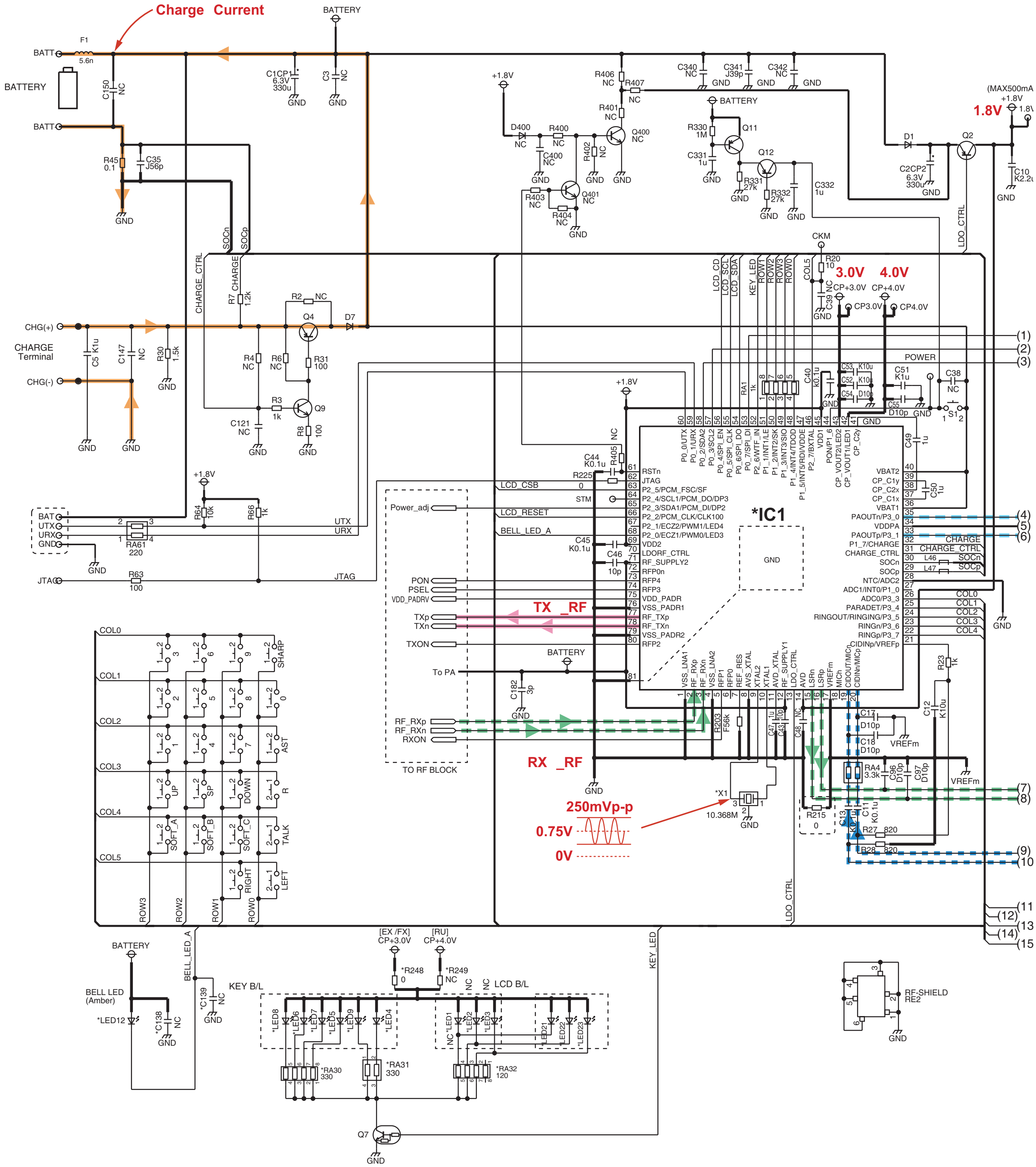


NC: No Components

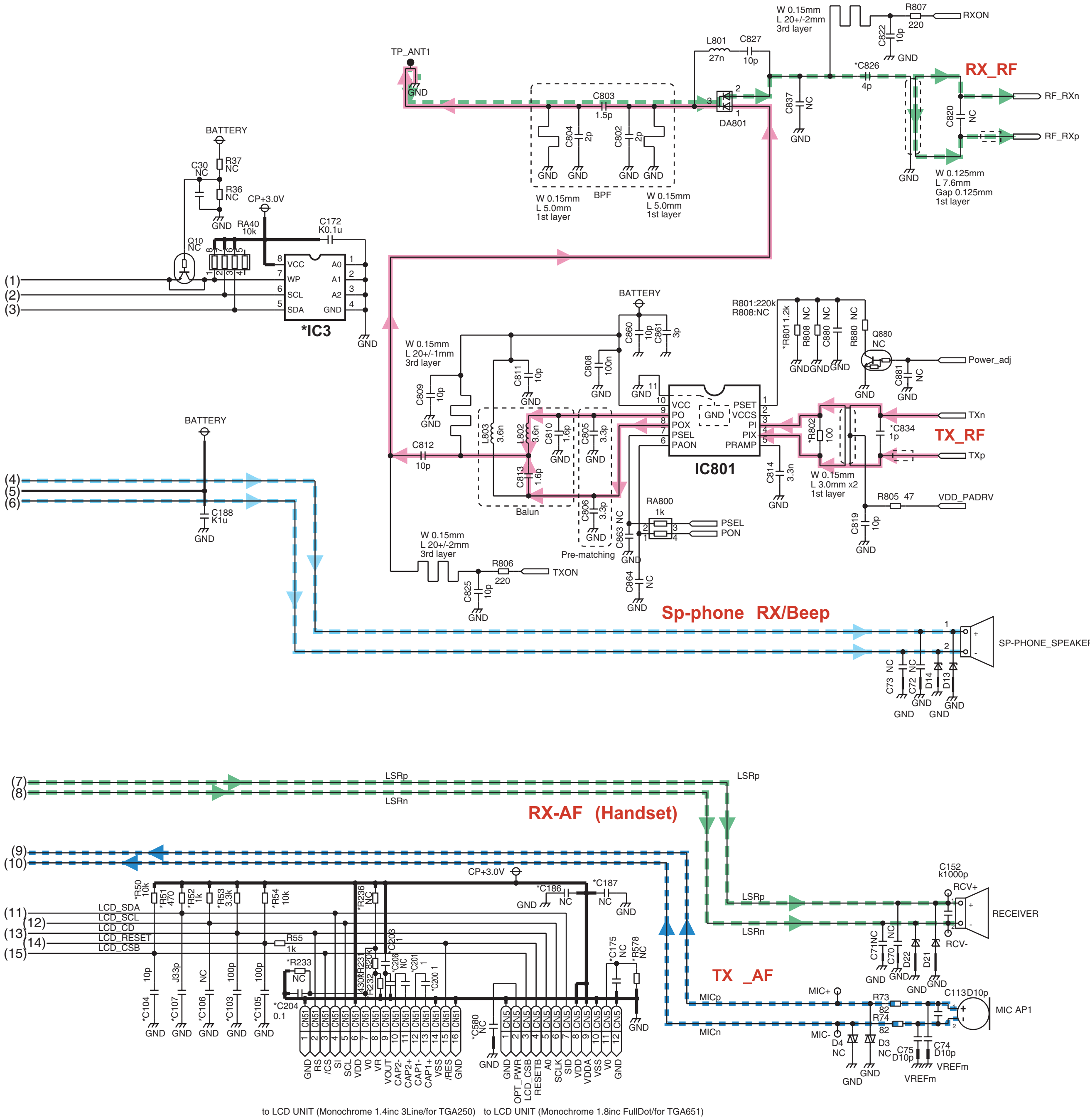
KX-TG4021/4022/4023 SCHEMATIC DIAGRAM (Base Unit_Operation)

Memo

14.4. Schematic Diagram (Handset_Main)

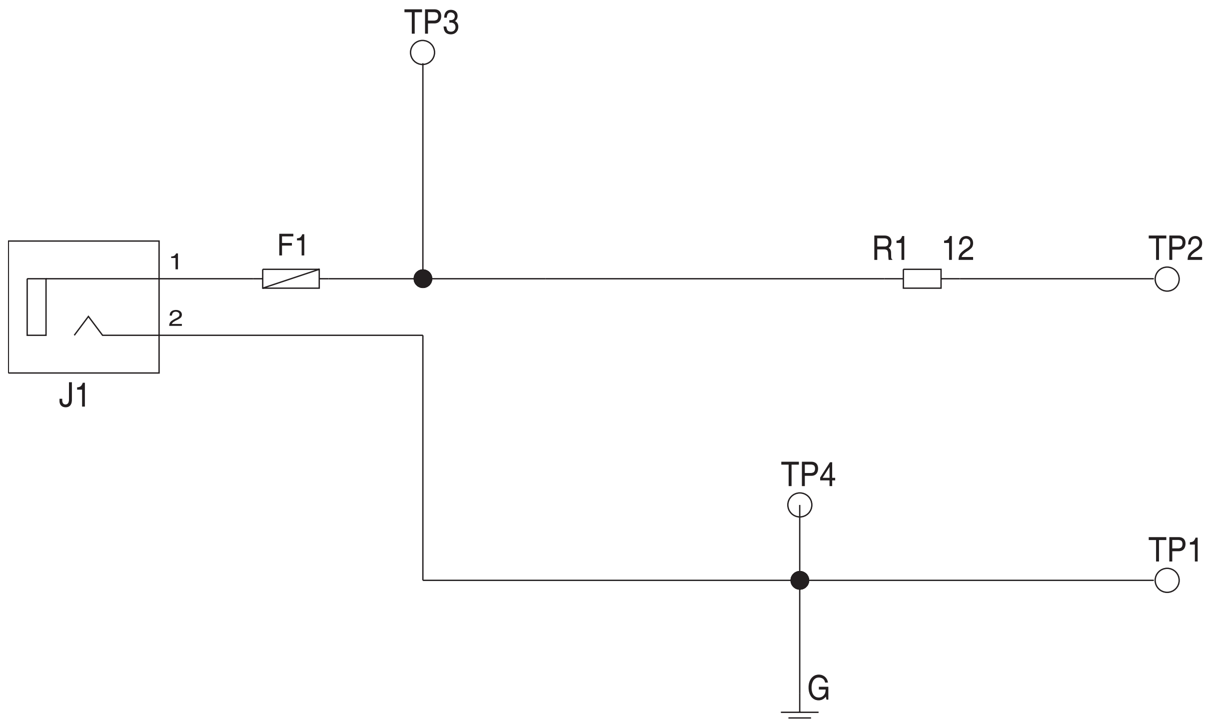


NC: No Components



KX-TGA403 SCHEMATIC DIAGRAM (Handset_Main)

14.5. Schematic Diagram (Charger Unit)

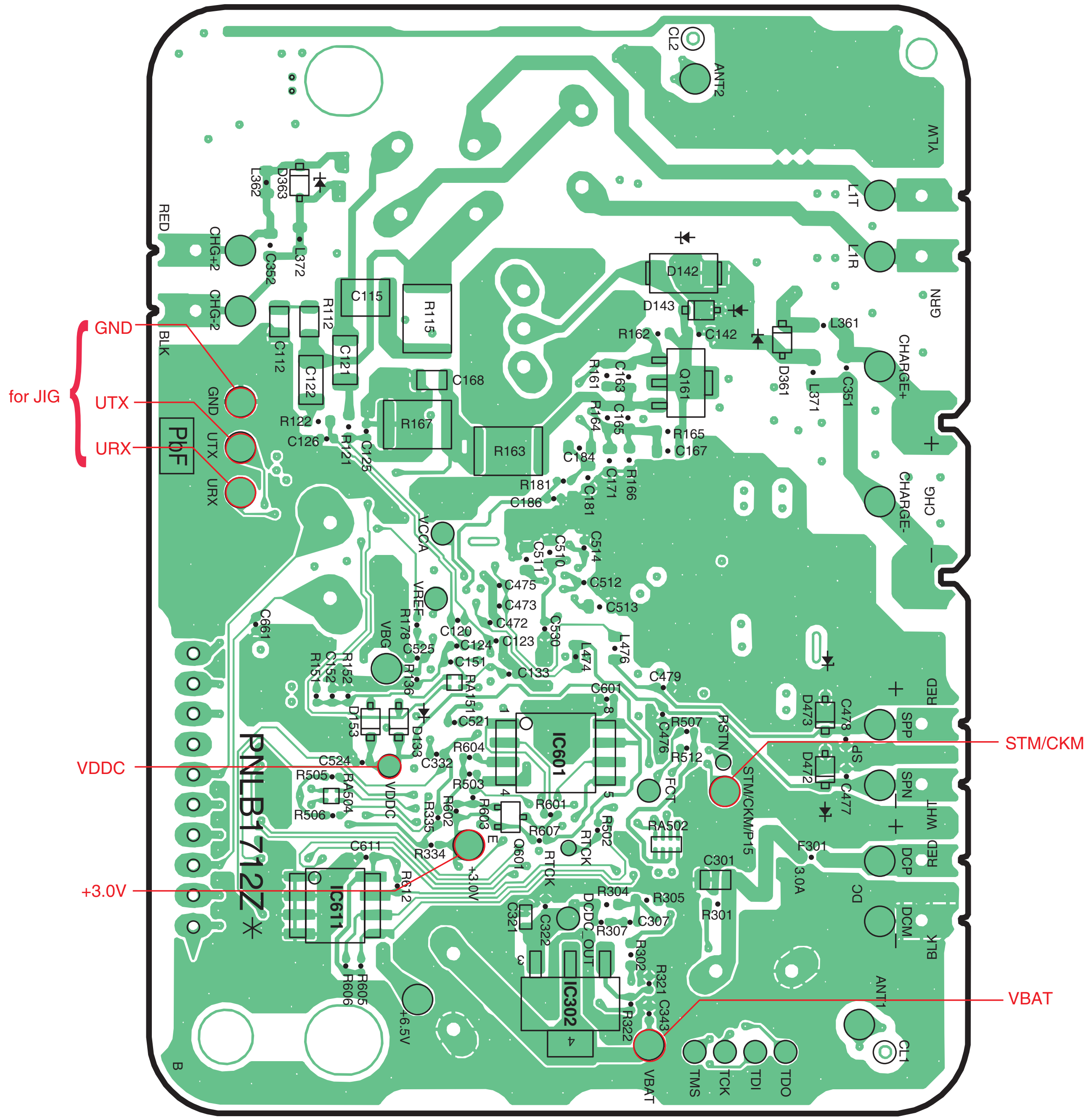


SCHEMATIC DIAGRAM (Charger Unit)

15 Printed Circuit Board

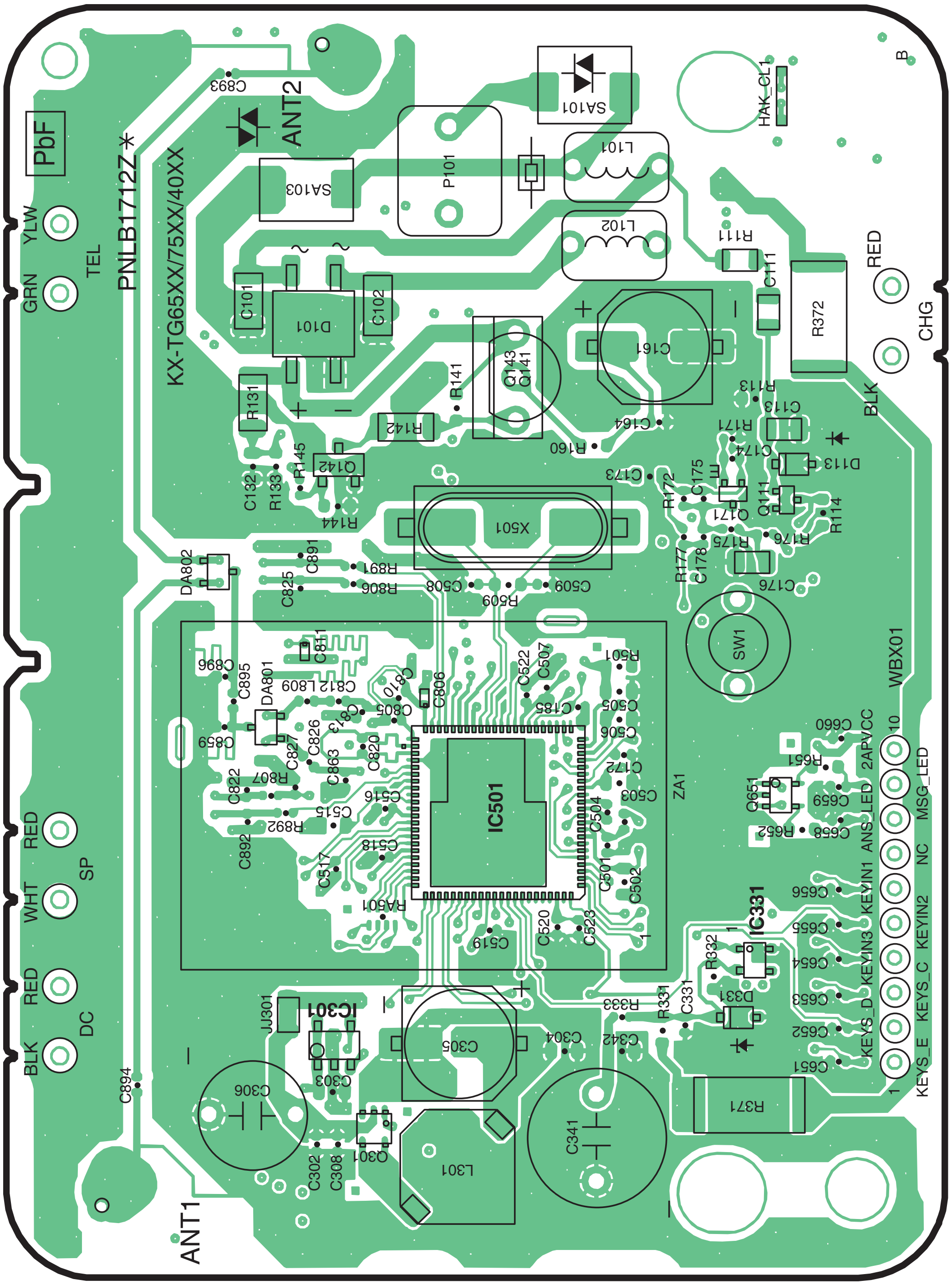
15.1. Circuit Board (Base Unit_Main)

15.1.1. Component View



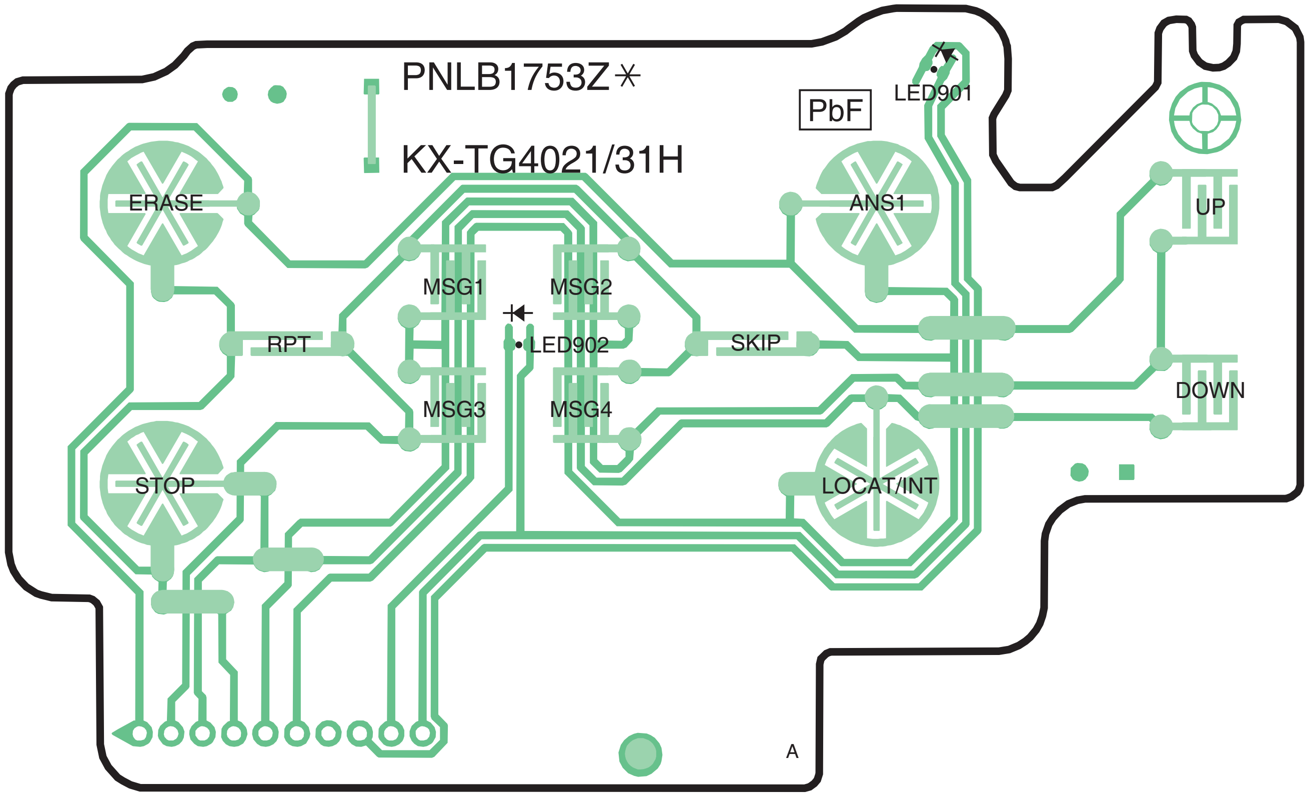
KX-TG4021/4022/4023 CIRCUIT BOARD (Base Unit_Main (Component View))

15.1.2. Bottom View



KX-TG4021/4022/4023 CIRCUIT BOARD (Base Unit_Main (Bottom View))

15.2. Circuit Board (Base Unit_Operation)

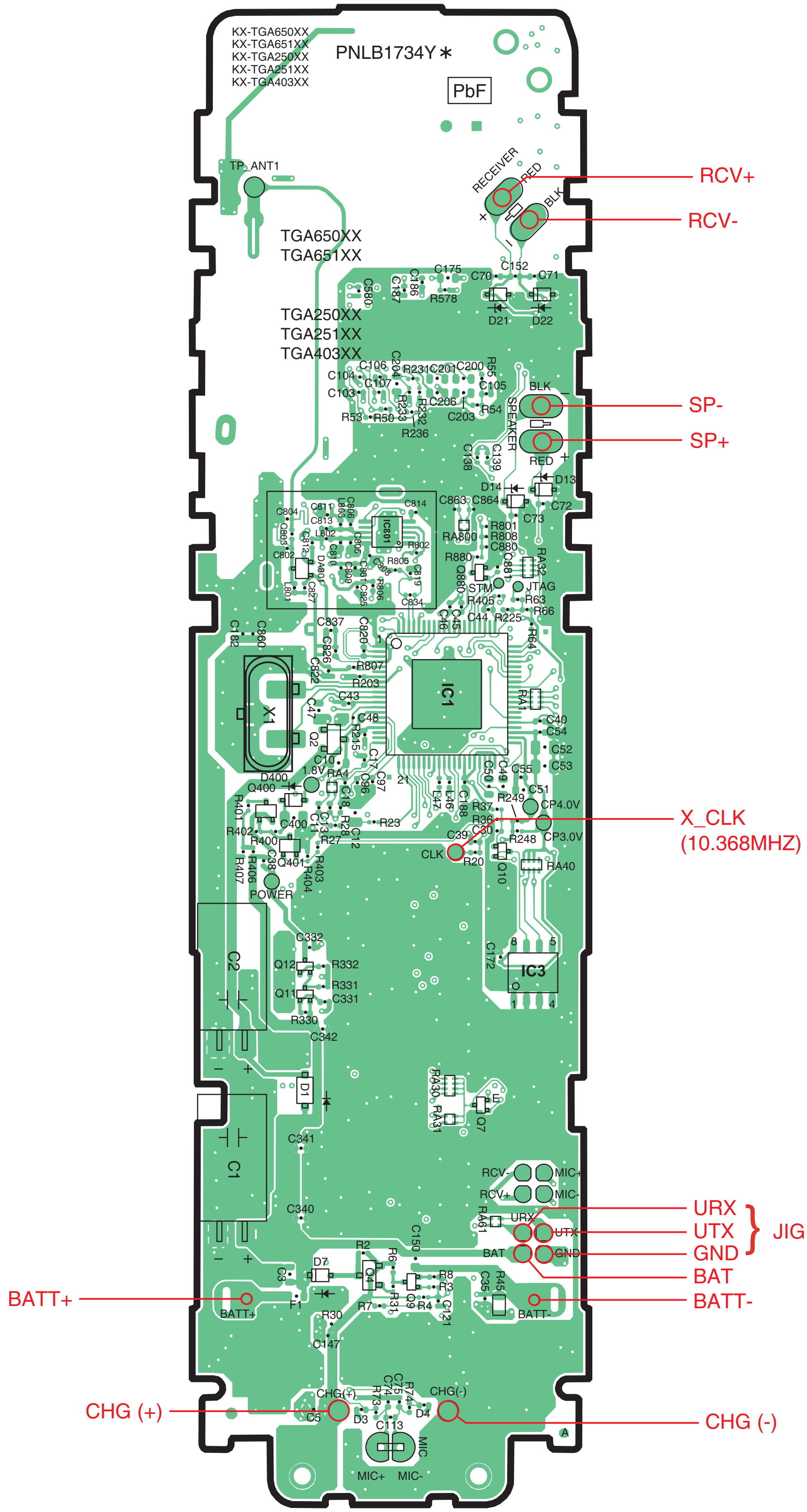


KX-TG4021/4022/4023 CIRCUIT BOARD (Base Unit_Operation (Component View))

Memo

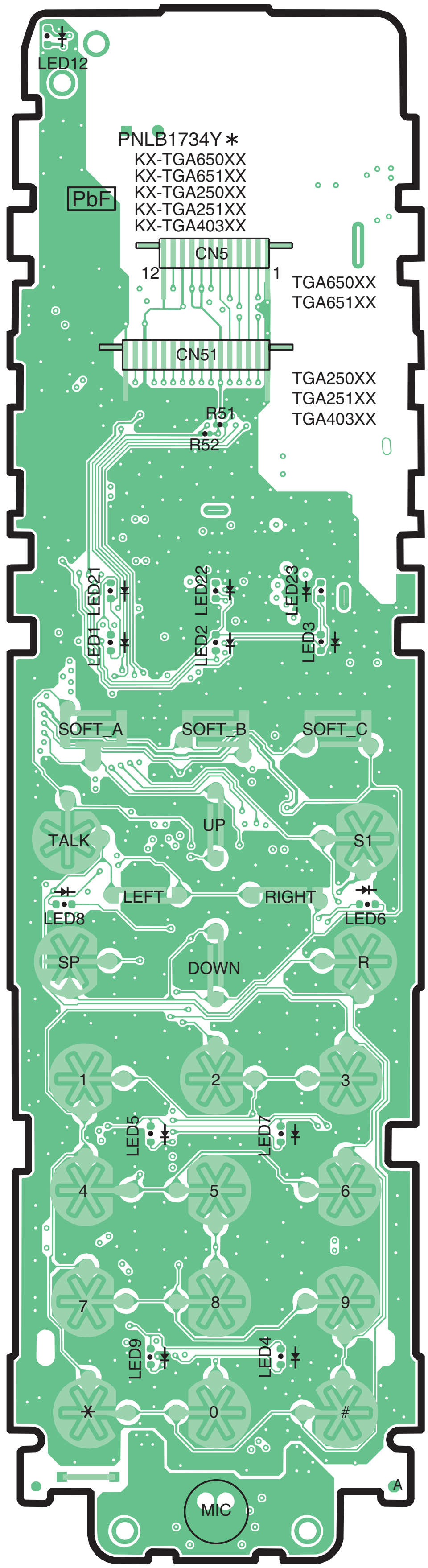
15.3. Circuit Board (Handset_Main)

15.3.1. Component View



KX-TGA403 CIRCUIT BOARD (Handset_Main (Component View))

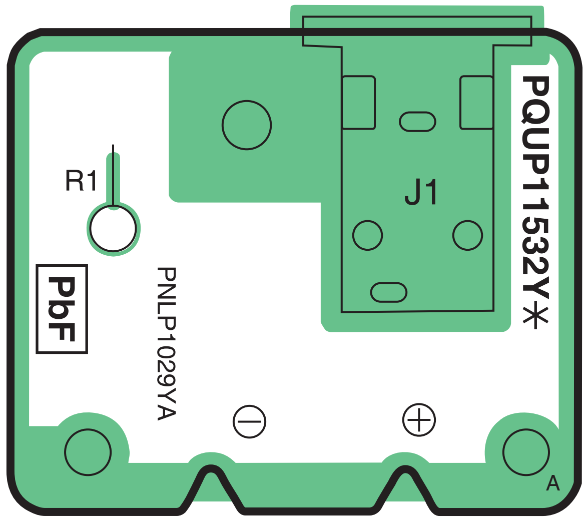
15.3.2. Bottom View



KX-TGA403 CIRCUIT BOARD (Handset_Main (Bottom View))

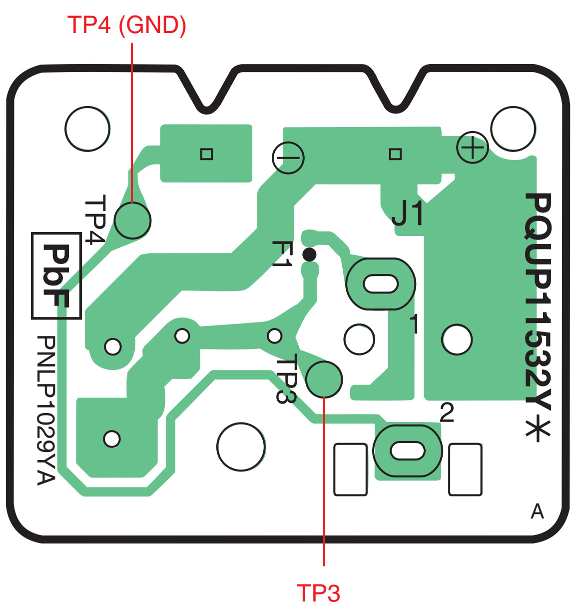
15.4. Circuit Board (Charger Unit)

15.4.1. Component View



CIRCUIT BOARD (Charger unit (Component View))

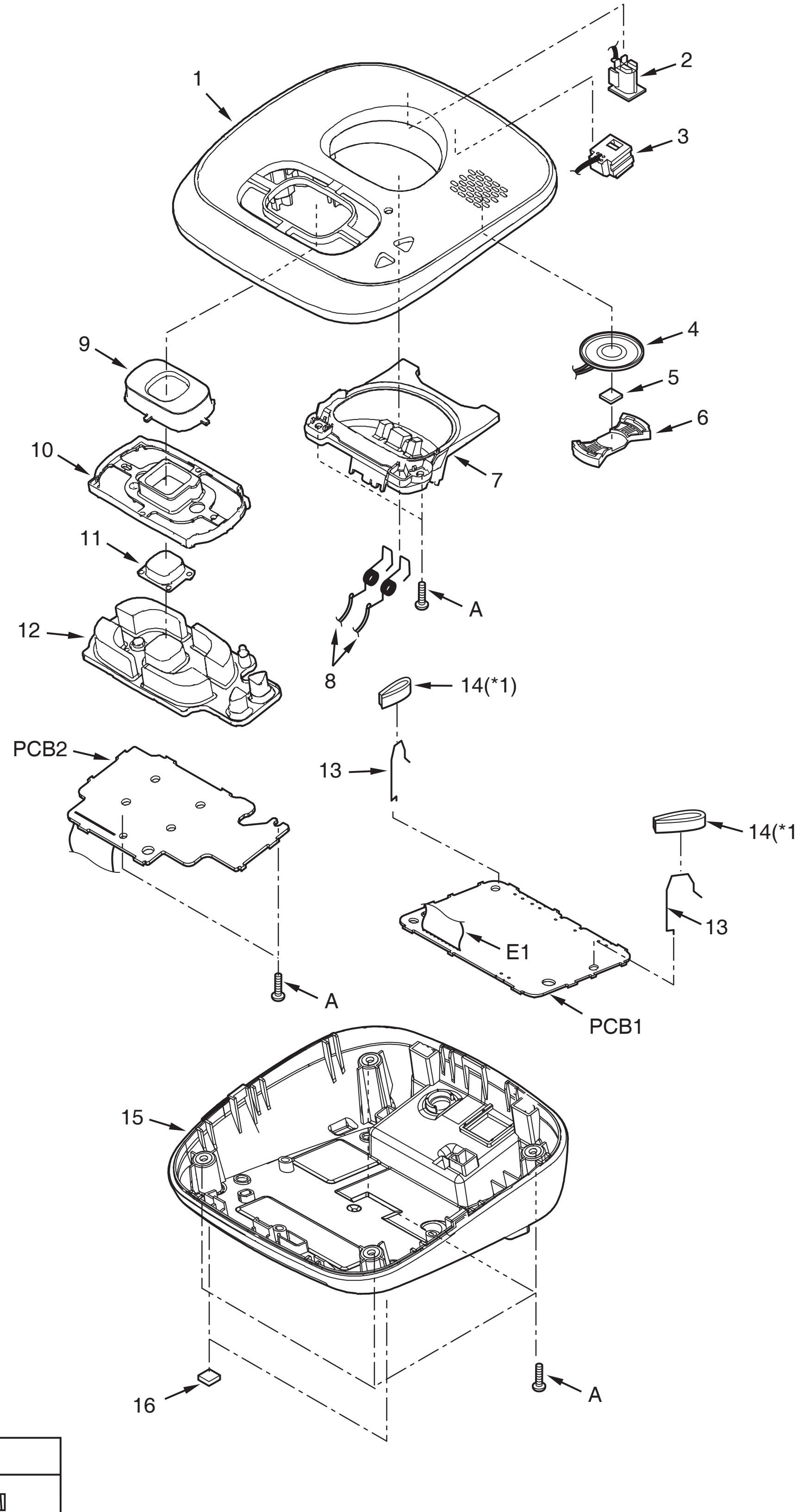
15.4.2. Bottom View



CIRCUIT BOARD (Charger unit (Bottom View))

16 Exploded View and Replacement Parts List

16.1. Cabinet and Electrical Parts (Base Unit)

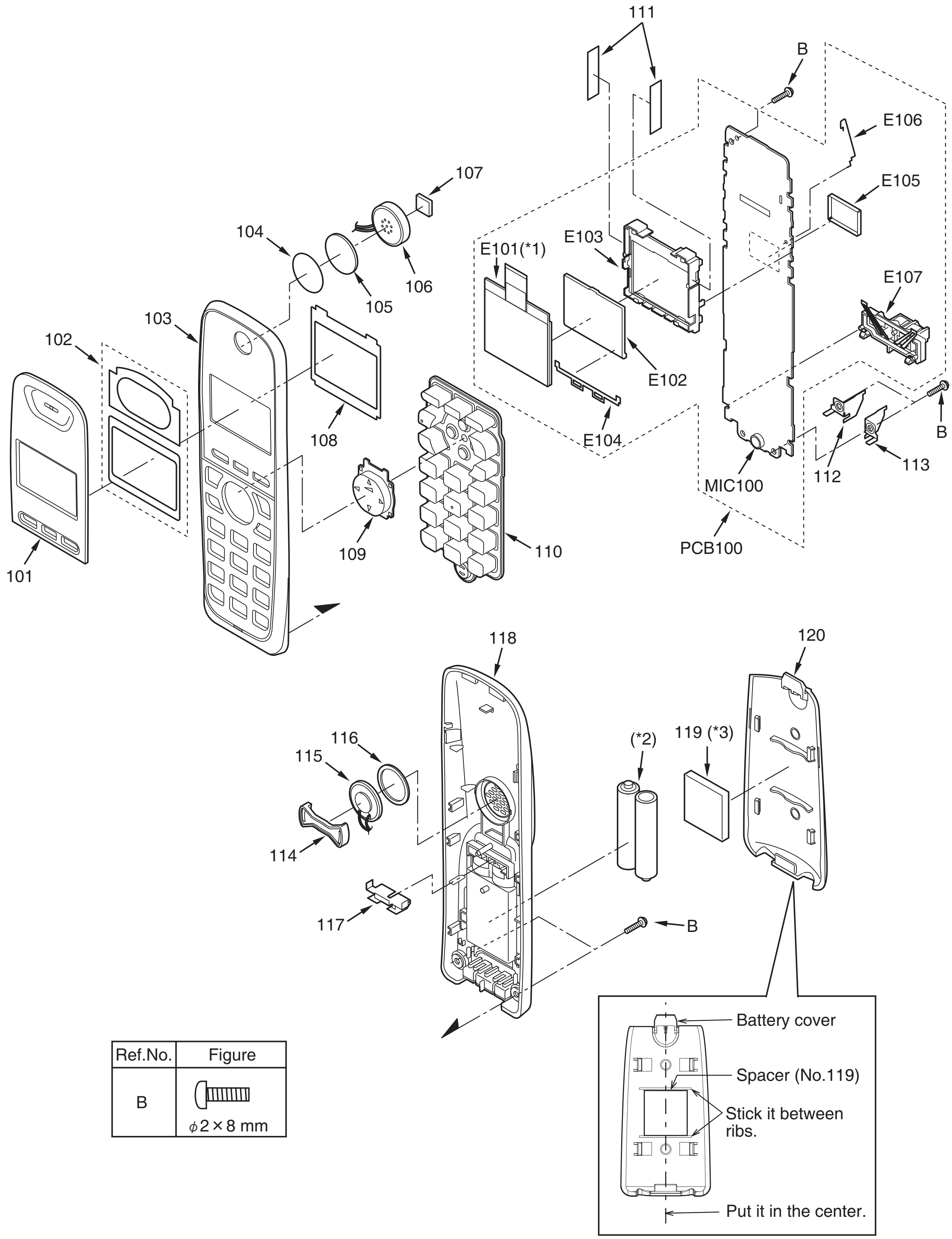


Ref.No.	Figure
A	ϕ2.6 x 8mm

Note:

(*1) The SPACERs (No.14) are cut from the excess parts of SPACER (No.108) of **Cabinet and Electrical Parts (Handset)** (P.81).

16.2. Cabinet and Electrical Parts (Handset)



Ref.No.	Figure
B	$\phi 2 \times 8$ mm

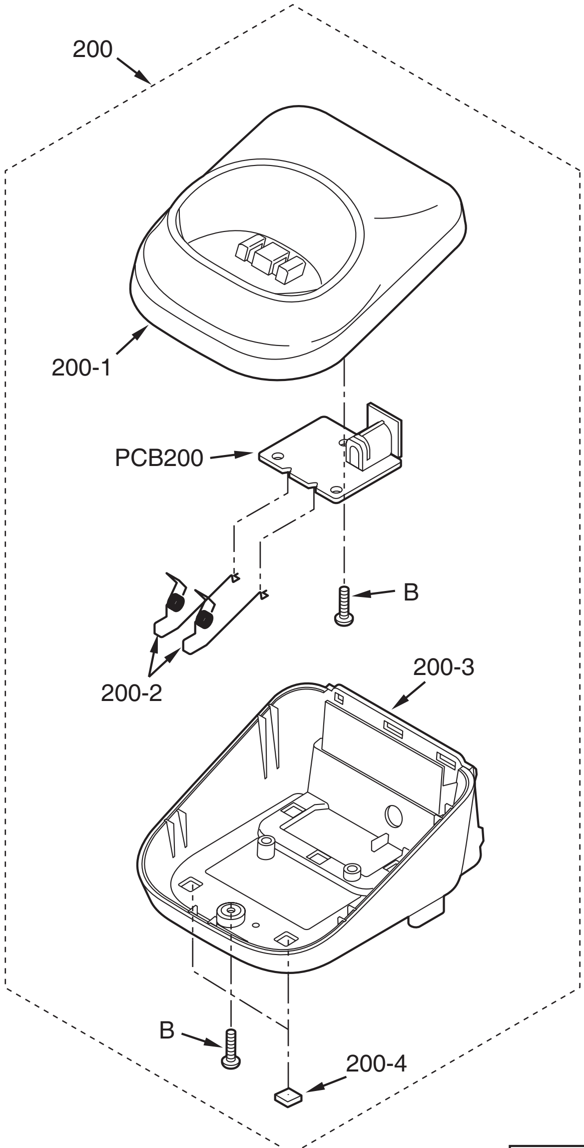
Note:

(*1) This cable is fixed by welding. Refer to **How to Replace the Handset LCD** (P.47).

(*2) The rechargeable Ni-MH battery HHR-4DPA or HHR-4MRT is available through sales route of Panasonic.

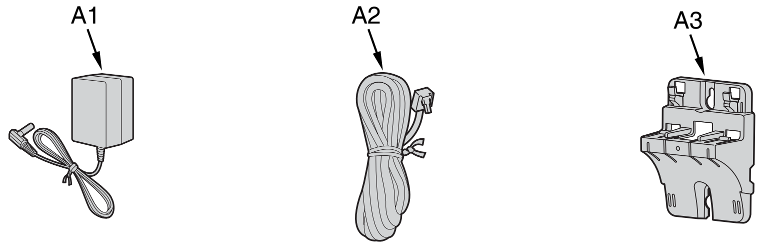
(*3) Attach the SPACER (No. 119) to the exact location described above.

16.3. Cabinet and Electrical Parts (Charger Unit)



Ref.No.	Figure
B	 ϕ2 × 8 mm

16.4. Accessories



16.5. Replacement Parts List

1. RTL (Retention Time Limited)

   Note:

   The "RTL" marking indicates that its Retention Time is Limited.

   When production is discontinued, this item will continue to be available only for a specific period of time.

   This period of time depends on the type of item, and the local laws governing parts and product retention.

   At the end of this period, the item will no longer be available.
2. Important safety notice

   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.
4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS

   Unless otherwise specified;

   All resistors are in ohms (Ω) k=1000Ω, M=1000kΩ

   All capacitors are in MICRO FARADS (μF) p=μμF

   *Type & Wattage of Resistor

Type

ERC:Solid ERDS:Carbon ERJ:Chip	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Chip ERS:Fusible Resistor ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage Of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol ECUV,PQCUV, ECUE:Chip ECQMS:Mica	ECCD,ECKD,ECBT,F1K,ECUV:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECST,EEE:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :16V 2A :100V

16.5.1. Base Unit

16.5.1.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	1	PNKM1132V3	CABINET BODY	PS-HB
	2	K2ECYZ000001	JACK, DC	
	3	PQJJ1T039S	JACK, MODULAR	
	4	L0AA02A00087	SPEAKER	
	5	PQHG10729Z	RUBBER PARTS, SPEAKER	
	6	PQHR11313Z	GUIDE, SPEAKER	ABS-HB
	7	PNKE1056Z1	CASE, CHARGE TERMINAL	PS-HB
	8	PNJT1047Z	CHARGE TERMINAL	
	9	PNBC1307Z1	BUTTON, NAVIGATOR KEY	PS-HB
	10	PNHR1259Z	GUIDE, BUTTON HOLDER	PS-HB
	11	PNBC1308Z1	BUTTON, MESSAGE	AS-HB
	12	PNJK1079Z	KEYBOARD SWITCH	
	13	PNLA1030Z	ANTENNA	
	14	PNYE1027Z	SPACER, ANTENNA	
	15	PNKF1099Y1	CABINET COVER	PS-HB
	16	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	

16.5.1.2. Main P.C. Board Parts

Note:

(*1) When replacing IC611 or X501, make the adjustment using PNZZTG4021LA. Refer to **How to download the data** (P.54) of Things to Do after Replacing IC or X'tal.

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWP14021LAH	MAIN P.C.BOARD ASS'Y (RTL)	
			(ICs)	
	IC302	C0CBAYG00016	IC	S
	IC331	C0EBE0000124	IC	
	IC501	C2HBCY000064	IC(BBIC)	
	IC601	PNWI24021LAH	IC(FLASH)	
	IC611	PNWI14021LAH	IC(EEPROM) (*1)	
			(TRANSISTORS)	
	Q111	2SC6054JSL	TRANSISTOR(SI)	
	Q141	B1ACGP000008	TRANSISTOR(SI)	
	Q142	PQVTBF822T7	TRANSISTOR(SI)	
	Q161	2SD0874AS	TRANSISTOR(SI)	
	Q171	2SC6054JSL	TRANSISTOR(SI)	
	Q651	B1GFCFEN0011	TRANSISTOR(SI)	S
			(DIODES)	
	D101	PQVDMD5S	DIODE(SI)	
	D113	MA111	DIODE(SI)	S
	D133	MA111	DIODE(SI)	S
	D143	MANV250GEL	DIODE(SI)	
	D473	MAZ805100L	DIODE(SI)	
	DA801	B0DDCD000001	DIODE(SI)	
	DA802	B0DDCD000001	DIODE(SI)	
			(COILS)	
	L101	PQLQXF330K	COIL	S
	L102	PQLQXF330K	COIL	S
	L361	G1CR22J00006	COIL	
	L371	G1CR22J00006	COIL	
	L476	G1CR22J00006	COIL	
	L501	G1CR10J00010	COIL	
	L809	G1C7N5JA0044	COIL	
			(RESISTOR ARRAYS)	
	RA151	D1H410220001	RESISTOR ARRAY	
	RA501	EXB28V330	RESISTOR ARRAY	
	RA502	EXB28V103	RESISTOR ARRAY	
	RA504	D1H468020001	RESISTOR ARRAY	
			(VARISTOR)	
	SA101	J0LF00000048	VARISTOR (SURGE ABSORBER)	
			(RESISTORS)	
	R111	PQ4R10XJ104	100k	S
	R112	PQ4R10XJ104	100k	S
	R113	ERJ3GEYJ103	10k	S
	R114	ERJ3GEYJ473	47k	S
	R121	ERJ3GEYJ394	390k	S
	R122	ERJ3GEYJ394	390k	S
	R131	PQ4R18XJ106	10M	S
	R133	ERJ3GEYJ334	330k	S
	R141	ERJ3GEYJ104	100k	S
	R142	PQ4R18XJ272	2.7k	S
	R145	ERJ2GEJ222	2.2k	S
	R151	ERJ2GEJ104	100k	S
	R152	ERJ2GEJ474X	470k	S
	R160	ERJ3GEYJ911	910	S
	R161	ERJ3GEYJ104	100k	S
	R162	ERJ3GEYJ473	47k	S
	R163	ERJ12YJ120	12	
	R164	ERJ3GEYJ272	2.7k	S
	R165	ERJ3GEYJ273	27k	S

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R167	ERJ12YJ270	27	
	R171	ERJ2GEJ220	22	S
	R172	ERJ2GEJ104	100k	S
	R175	ERJ2GEJ561	560	S
	R176	ERJ2GEJ101	100	S
	R178	ERJ2GEJ102	1k	S
	R181	ERJ2GE0R00	0	S
	R321	ERJ2RKF1400	140	
	R322	ERJ2RKF1000	100	
	R331	ERJ3EKF4702	47k	
	R332	ERJ3EKF6802	68k	
	R334	ERJ2GEJ473	47k	S
	R335	ERJ2GE0R00	0	S
	R371	ERJ1TYJ5R6U	5.6	
	R372	ERJ1TYJ5R6U	5.6	
	R501	ERJ3GEYJ100	10	S
	R502	ERJ2GEJ330	33	S
	R505	ERJ2GEJ222	2.2k	S
	R512	ERJ2GEJ102	1k	S
	R604	ERJ2GEJ103	10k	S
	R605	ERJ2GEJ332	3.3k	S
	R606	ERJ2GEJ332	3.3k	S
	R607	ERJ2GE0R00	0	S
	R612	ERJ2GEJ103	10k	S
	R651	ERJ3GEYJ681	680	S
	R652	ERJ3GEYJ681	680	S
	R806	ERJ2GEJ471	470	S
	R807	ERJ2GEJ471	470	S
	R891	ERJ2GEJ471	470	S
	R892	ERJ2GEJ471	470	S
			(CAPACITORS)	
	C101	F1K2H681A008	680p	
	C102	F1K2H681A008	680p	
	C111	F1J2A473A024	0.047	
	C112	F1J2A473A024	0.047	
	C113	PQCUV1A684KB	0.68	
	C120	ECUE1H102KBQ	0.001	
	C121	F1K2H681A008	680p	
	C122	F1K2H681A008	680p	
	C123	ECUE1H100DCQ	10p	
	C126	ECUE1H100DCQ	10p	
	C132	ECUV1H103KBV	0.01	
	C142	ECUV1H103KBV	0.01	
	C151	ECUE1H100DCQ	10p	
	C152	ECUE1C103KBQ	0.01	
	C161	F2G1H1000009	10	
	C167	ECUV1H102KBV	0.001	
	C171	ECUV1C223KBV	0.022	
	C173	ECUV1A224KBV	0.22	
	C175	ECUE1H102KBQ	0.001	
	C176	PQCUV0J106KB	10	
	C178	ECUE1C223KBQ	0.022	
	C184	ECUV1A105KBV	1	
	C186	ECUE1H100DCQ	10p	
	C302	ECUE1H100DCQ	10p	
	C306	F2A1C1010119	100	
	C321	ECUV1A105KBV	1	
	C322	ECUE1H100DCQ	10p	
	C341	F2A1A3310040	330	
	C342	ECUV1C104KBV	0.1	
	C343	ECUE1H100DCQ	10p	
	C351	ECUV1C105KBV	1	
	C352	ECUV1C104KBV	0.1	
	C476	ECUE1H100DCQ	10p	
	C477	ECUE1H100DCQ	10p	
	C478	ECUE1H100DCQ	10p	
	C479	ECUE1H100DCQ	10p	
	C501	ECUE1A104KBQ	0.1	
	C502	ECJ1VB0G106M	10	
	C503	ECJ1VB0G106M	10	
	C504	ECUE0J105KBQ	1	
	C505	ECJ1VB0G106M	10	
	C506	ECUV1A105KBV	1	
	C507	ECUV1A225KB	2.2	
	C508	ECUE1H100DCQ	10p	
	C509	ECUE1H120JCQ	12p	
	C510	ECUV1A105KBV	1	
	C511	ECJ1VB0G106M	10	
	C512	ECUE1A104KBQ	0.1	
	C513	ECUV1A225KB	2.2	
	C514	ECUE1A104KBQ	0.1	
	C515	ECUV1A105KBV	1	
	C516	ECUE1A104KBQ	0.1	
	C517	ECUE1A104KBQ	0.1	
	C518	ECUE1A104KBQ	0.1	
	C519	ECUE1A104KBQ	0.1	
	C520	ECUE1A104KBQ	0.1	
	C521	ECUE0J105KBQ	1	
	C522	ECUE1H100DCQ	10p	
	C530	ECUE1H100DCQ	10p	
	C601	ECUE1A104KBQ	0.1	
	C611	ECUE1A104KBQ	0.1	
	C805	F1G1H2R7A480	2.7p	
	C806	F1G1H2R7A480	2.7p	
	C810	F1G1H2R4A480	2.4p	
	C811	F1G1H100A723	10p	
	C812	F1G1HR90A480	0.9p	
	C813	F1G1H2R0A480	2p	
	C820	F1G1H1R5A480	1.5p	
	C822	F1G1H100A723	10p	
	C825	F1G1H100A723	10p	
	C826	F1G1H100A723	10p	
	C827	F1G1H100A723	10p	
	C859	F1G1H2R2A480	2.2p	
	C863	F1G1H1R5A480	1.5p	
	C891	F1G1H5R0A480	5p	
	C892	F1G1H5R0A480	5p	
	C893	F1G1H3R0A480	3p	
	C894	F1G1H2R2A480	2.2p	
	C895	F1G1H1R2A480	1.2p	
	C896	F1G1H2R2A480	2.2p	
			(OTHERS)	
	E1	WBX10SH-3.5G	LEAD WIRE, PARALLEL WIRE	
	P101	D4DAY220A022	THERMISTOR (POSISTOR)	S
	F301	K5H302Y00003	FUSE	
	X501	H0J138500011	CRYSTAL OSCILLATOR (*1)	

16.5.1.3. Operational P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB2	PNWP2TG4031H	OPERATIONAL P.C.BOARD ASS'Y (RTL)	
			(DIODES)	
	LED901	LNJ237W82RA	LED	S
	LED902	LNJ237W82RA	LED	S

16.5.2. Handset

16.5.2.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	101	PNGP1087Y5	PANEL, LCD	PMMA-HB
	102	PNYE1026Z	TAPE, DOUBLESIDED	
	103	PNKM1123Y6	CABINET BODY	PS-HB
	104	PNHS1072Z	SPACER, RECEIVER NET	
	105	PQHS10467Z	COVER, SPEAKER NET	
	106	L0AD02A00043	RECEIVER	
	107	PQHG10729Z	RUBBER PARTS, RECEIVER	
	108	PNYE1027Z	SPACER, CUSHION LCD	
	109	PNBC1003Y3	BUTTON, VOLUME KEY	ABS-HB
	110	PNJK1071V	KEYBOARD SWITCH	
	111	PNHX1165Z	COVER, LCD SHEET	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	112	PNJT1027Z	CHARGE TERMINAL (L)	
	113	PNJT1026Z	CHARGE TERMINAL (R)	
	114	PQHR11315Z	GUIDE, SPEAKER	ABS-HB
	115	L0AA02A00095	SPEAKER	
	116	PQHS10784Y	SPACER, SPEAKER NET	
	117	PQJC10056W	BATTERY TERMINAL	
	118	PNKF1093Z1	CABINET COVER	ABS-HB
	119	PNHS1079Z	SPACER, BATTERY	
	120	PNKK1038Y1	LID, BATTERY	ABS-HB

16.5.2.2. Main P.C. Board Parts

Note:

(*1) Reconfirm the model No. written on the handset's name plate when replacing PCB100. Because the model No. of the optional handset may differ from the included handset.

(*2) When replacing IC3 or X1, make the adjustment using PNZZTG4021LA. Refer to **Handset** (P.55) of Things to Do after Replacing IC or X'tal.

(*3) When replacing the handset LCD, See **How to Replace the Handset LCD** (P.47).

(*4) When removing E106, use special tools (ex. Hot air disordering tool).

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB100	PNWPGA403LAR	MAIN P.C.BOARD ASS'Y (RTL) (*1)	
			(ICs)	
	IC1	C1CB00003361	IC (BBIC (FLASH))	
	IC3	PNWIGA403LAR	IC (EEPROM) (*2)	
	IC801	C1CB00001842	IC	
			(TRANSISTORS)	
	Q2	B1ADGE000004	TRANSISTOR(SI)	
	Q4	B1ADGE000004	TRANSISTOR(SI)	
	Q7	UN9219J	TRANSISTOR(SI)	S
	Q9	2SC6054JSL	TRANSISTOR(SI)	
	Q11	B1ADCF000161	TRANSISTOR(SI)	
	Q12	B1ADCF000161	TRANSISTOR(SI)	
			(DIODES)	
	D1	MA2YD2120L	DIODE(SI)	
	D7	MA2ZD0200L	DIODE(SI)	
	D13	MA8043M	DIODE(SI)	S
	D14	MA8043M	DIODE(SI)	S
	D21	MA8043M	DIODE(SI)	S
	D22	MA8043M	DIODE(SI)	S
	DA801	B0DDCD000001	DIODE(SI)	
			(LEDS)	
	LED4	B3ACB0000190	LED	
	LED5	B3ACB0000190	LED	
	LED6	B3ACB0000190	LED	
	LED7	B3ACB0000190	LED	
	LED8	B3ACB0000190	LED	
	LED9	B3ACB0000190	LED	
	LED21	B3ACB0000216	LED	
	LED22	B3ACB0000216	LED	
	LED23	B3ACB0000216	LED	
			(COILS)	
	F1	PQLQR2M5N6K	COIL	S
	L801	G1C27NJ00010	COIL	
	L802	G1C3N6ZA0063	COIL	
	L803	G1C3N6ZA0063	COIL	
			(RESISTOR ARRAYS)	
	RA1	D1H810240004	RESISTOR ARRAY	S
	RA4	D1H433220001	RESISTOR ARRAY	
	RA30	D1H83314A013	RESISTOR ARRAY	S
	RA31	D1H433120001	RESISTOR ARRAY	
	RA32	EXB28V121JX	RESISTOR ARRAY	
	RA40	EXB28V103	RESISTOR ARRAY	
	RA61	D1H422120001	RESISTOR ARRAY	
	RA800	D1H410220001	RESISTOR ARRAY	
			(IC FILTERS)	
	L46	J0JDC0000045	IC FILTER	
	L47	J0JDC0000045	IC FILTER	
			(RESISTORS)	
	R3	ERJ2GEJ102	1k	S
	R7	ERJ2GEJ122	1.2k	S
	R8	ERJ2GEJ101	100	S
	R20	ERJ2GEJ100	10	S
	R23	ERJ2GEJ102	1k	S
	R27	ERJ2GEJ821	820	S
	R28	ERJ2GEJ821	820	S
	R30	ERJ3GEYJ152	1.5k	S
	R31	ERJ2GEJ101	100	S
	R45	ERJ6RSJR10V	0.1	
	R50	ERJ2GEJ103	10k	S
	R51	ERJ2GEJ471	470	S
	R52	ERJ2GEJ102	1k	S
	R53	ERJ2GEJ332	3.3k	S
	R54	ERJ2GEJ103	10k	S
	R55	ERJ2GEJ102	1k	S
	R63	ERJ2GEJ101	100	S
	R64	ERJ2GEJ103	10k	S
	R66	ERJ2GEJ102	1k	S
	R73	ERJ2GEJ820	82	S
	R74	ERJ2GEJ820	82	S
	R203	D0GA563ZA006	56k	
	R215	ERJ2GE0R00	0	S
	R225	ERJ2GE0R00	0	S
	R231	ERJ2GEJ824	820k	S
	R232	ERJ2GEJ434X	430k	S
	R248	ERJ2GE0R00	0	S
	R330	ERJ2GEJ105X	1M	S
	R331	ERJ2GEJ273X	27k	S
	R332	ERJ2GEJ273X	27k	S
	R801	ERJ2GEJ122	1.2k	S
	R802	ERJ2GEJ101	100	S
	R805	ERJ2GEJ470	47	S
	R806	ERJ2GEJ221	220	S
	R807	ERJ2GEJ221	220	S
			(CAPACITORS)	
	C1	F2A0J3310067	330	
	C2	F2A0J3310067	330	
	C5	ECUV1A105KBV	1	
	C10	ECUV1A225KB	2.2	
	C11	ECUE1A104KBQ	0.1	
	C12	PQCUV0J106KB	10	
	C13	ECUE1A104KBQ	0.1	
	C17	ECUE1H100DCQ	10p	
	C18	ECUE1H100DCQ	10p	
	C35	ECUE1H560JCQ	56p	
	C40	ECUE1A104KBQ	0.1	
	C43	ECUE1H100DCQ	10p	
	C44	ECUE1A104KBQ	0.1	
	C45	ECUE1A104KBQ	0.1	
	C46	ECUE1H100DCQ	10p	
	C47	ECUV1A105KBV	1	
	C49	ECUV1A105KBV	1	
	C50	ECUV1A105KBV	1	
	C51	ECUV1A105KBV	1	
	C52	PQCUV0J106KB	10	
	C53	PQCUV0J106KB	10	
	C54	ECUE1H100DCQ	10p	
	C55	ECUE1H100DCQ	10p	
	C74	ECUE1H100DCQ	10p	
	C75	ECUE1H100DCQ	10p	
	C96	ECUE1H100DCQ	10p	
	C97	ECUE1H100DCQ	10p	
	C103	ECUE1H101JCQ	100p	
	C104	F1G1H100A723	10p	
	C105	ECUE1H101JCQ	100p	
	C107	ECUE1H330JCQ	33p	S
	C113	ECUE1H100DCQ	10p	
	C152	ECUE1H102KBQ	0.001	
	C172	ECUE1A104KBQ	0.1	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C182	F1G1H3R0A480	3p	
	C188	ECUE0J105KBQ	1	
	C200	ECUV1C105KBV	1	
	C201	ECUV1C105KBV	1	
	C203	ECUV1C105KBV	1	
	C204	ECUV1C104KBV	0.1	
	C331	ECUE0J105KBQ	1	
	C332	ECUE0J105KBQ	1	
	C341	ECUE1H390JCQ	39p	
	C802	F1G1H2R0A480	2.0p	
	C803	F1G1H1R5A480	1.5p	
	C804	F1G1H2R0A480	2.0p	
	C805	F1G1H3R3A480	3.3p	
	C806	F1G1H3R3A480	3.3p	
	C808	ECUE1A104KBQ	0.1	
	C809	F1G1H100A723	10p	
	C810	F1G1H1R6A480	1.6p	
	C811	F1G1H100A723	10p	
	C812	F1G1H100A723	10p	
	C813	F1G1H1R6A480	1.6p	
	C814	ECUE1H332KBQ	0.0033	
	C819	F1G1H100A723	10p	
	C822	F1G1H100A723	10p	
	C825	F1G1H100A723	10p	
	C826	F1G1H4R0A480	4p	
	C827	F1G1H100A723	10p	
	C834	F1G1H1R0A480	1p	
	C860	F1G1H100A723	10p	
	C861	F1G1H3R0A480	3p	
			(OTHERS)	
	MIC100	L0CBAY000032	MICROPHONE	
	E101	L5DYBYY00012	LIQUID CRYSTAL DISPLAY (*3)	
	E102	PNHR1247Z	TRANSPARENT PLATE, LCD	PMMA-HB
	E103	PNHR1246Z	GUIDE, LCD	ABS-HB
	E104	PNHX1254Z	COVER, LCD	
	E105	PNLA1020Z	ANTENNA	
	E106	PNMC1013Z	CASE,MAGNETIC SHIELD (*4)	
	E107	PNVE1002Z	BATTERY TERMINAL	
	X1	H0J103500033	CRYSTAL OSCILLATOR (*2)	

16.5.3. Charger Unit

16.5.3.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	200	PNLC1010ZT	CHARGER UNIT ASS'Y without NAME PLATE (RTL)(for KX-TG4022LAT)(for KX-TG4023LAT)	
	200-1	PNKM1131Y2	CABINET BODY	PS-HB
	200-2	PNJT1010Z	CHARGE TERMINAL	
	200-3	PNKF1098Z1	CABINET COVER	PS-HB
	200-4	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	

16.5.3.2. Main P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB200	PNWPTGA641CH	MAIN P.C.BOARD ASS'Y (RTL)	
			(JACK)	
	J1	K2ECYB000001	JACK	S
			(RESISTOR)	
	R1	ERG2SJ120	12	
			(FUSE)	
	F1	K5H302Y00003	FUSE	

16.5.4. Accessories

Note:

You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A1	PQLV219Y	AC ADAPTOR	
	A2	PQJA10075Z	CORD, TELEPHONE	
	A3	PNKL1010Z1	STAND, WALLMOUNT	ABS-HB

16.5.5. Screws

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	A	XTB26+8GFJ	TAPPING SCREW	
	B	XTB2+8GFJ	TAPPING SCREW	

16.5.6. Fixtures and Tools

Note:

(*1) See **Equipment Required** (P.48), and **The Setting Method of JIG** (P.48)

(*2) When replacing the Handset LCD, See **How to Replace the Handset LCD** (P.47)

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
		PQZZ1CD300E	JIG CABLE (*1)	
		PNZZTG4021LA	BATCH FILE CD-ROM (*1)	
		PQZZ430PIR	TIP OF SOLDERING IRON (*2)	
		PQZZ430PRB	RUBBER OF SOLDERING IRON (*2)	

T.I

KXTG4021LAT

KXTG4022LAT

KXTG4023LAT

KXTGA403LAT